operating and service manual
h/p/cosmos® running machines

- 150/50 (mercury®)
- 170-190/65 (quasar® / pulsar®)
- 190/65 3p (pulsar® 3p)
- 200-450/75-300 (venus® / saturn®)

h/p/cosmos® model names
h/p/cosmos mercury® / mercury® med
h/p/cosmos stratos® / stratos® med
h/p/cosmos locomotion® 150/50 E / DE med
h/p/cosmos gaitway® II F / S
incl. lt-models

h/p/cosmos quasar® / quasar® med
h/p/cosmos stellar® / stellar® med
h/p/cosmos pulsar®
h/p/cosmos locomotion® 190/65 E / DE med
incl. lt-models

h/p/cosmos pulsar® 3p
h/p/cosmos locomotion® 190/65 3p E / DE med
incl. lt-models

h/p/cosmos venus® - all sizes
h/p/cosmos saturn® - all sizes

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firmware MCU5-v1.07, revision 07.02.2013
manual order-no.: [cos14310m5-v1.07hpc-en]

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This user manual / operating instructions / service guide is only valid for the firmware-/software version noted on the first page of this manual and only for the original configuration of the first delivery of the machine. Firmware updates, software updates, changes of the system configuration or retrofittings of additional equipment or accessories can result in invalidity of this manual. In case of alterations of the device or the additional equipment; the latest version of the manual or the corresponding additional information always should be considered.

The latest manual version is always available in PDF version on the h/p/cosmos website:
http://www.h-p-cosmos.com/en/company/downloads.htm

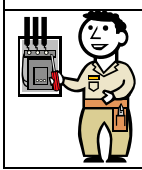
- It is strictly forbidden to perform any amendments of the technical design, technical specifications, labelling and configurations (except allowed programming as described in this manual) of this machine and the software and accessories connected to this machine.
- Any amendments, unauthorized, poor or lack of service / maintenance will result in loss of manufacturer's liability and warranty.

Dear customer,

We would like to express our gratitude for putting your trust in us, in deciding for this top of the range running machine. Since 1988 h/p/cosmos® has been developing and manufacturing running machines, systems and accessories for applications in sports, rehabilitation, medicine, diagnostics and science. When it comes to technology, ergonomy, design and safety, we have set extremely high standards for ourselves.

Because the running machine is a motor-driven device, you must pay special attention to the mentioned safety regulations. If proper notice is taken of the safety regulations, the operation of our running machines is nearly without risk. Neglect of the safety regulations could result in dangerous situations and accidents with serious injury or death. Therefore please read this operating and service manual and the danger precautions in full before taking the device into operation.

Some simple maintenance and monitoring (no repair work!), as described, can easily be done or even have to be done by yourself. All kinds of installation and repair work and most maintenance work are to be performed only by trained and authorized technicians who have been certified by h/p/cosmos. The following symbols will indicate which work can be done by the customer and which work has to be done only by authorized technicians:

	The customer/user should perform this maintenance and monitoring work. Some safety checks or monitoring (for examples harnesses and ropes, running belt condition and position, etc.) have to be performed on daily basis. It is not expedient to contract certified technicians for such maintenance work. However, where it is practical, all maintenance and monitoring work marked with this symbol can also be performed by certified technicians.
	All installation, maintenance, repair and monitoring work marked with this symbol must only be performed by trained and authorized technicians who have been certified by h/p/cosmos. Customers/users must not perform these kinds of tasks and work.

We recommend calling our competent service team or entering into a maintenance contract for a routine service at an interval of 6 or 12 months for standard machines and standard applications. A form for registration of your institution and device is included in the delivery. In order to be able to supply you with the latest technical information and service, it is important for you to fill out the form. Therefore please fill out the form for registration immediately and send it back via fax, email or mail.

This operating and service manual as a firm part of the delivery has to be accessible to the user at any time. It has been written with great care. Should you, however, still find any details which do not correspond with your device, please notify us so that we can correct any mistakes as soon as possible. Subject to alterations without prior notice.
Errors and omissions excepted. E & OE.

We wish you a lot of fun and success while exercising and working with your h/p/cosmos running machine.

Franz Harrer
President & CEO
h/p/cosmos sports & medical gmbh

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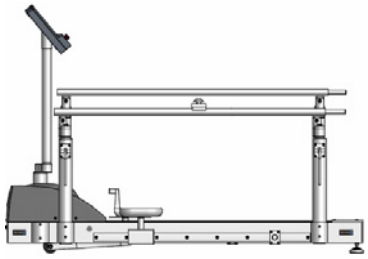
1 Model overview



CE 0123
medical
running machines

h/p/cosmos locomotion® 150/50 E med
h/p/cosmos locomotion® 150/50 DE med
h/p/cosmos locomotion® 190/65 E med
h/p/cosmos locomotion® 190/65 DE med
h/p/cosmos locomotion® 190/65-3p E med
h/p/cosmos locomotion® 190/65-3p DE med

CE
sports & fitness
running machines

h/p/cosmos stratos® lt med
h/p/cosmos stratos® med
h/p/cosmos mercury® lt med
h/p/cosmos mercury® med
h/p/cosmos Kistler Gaitway® II F
h/p/cosmos Kistler Gaitway® II S

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2 Introduction

2.1 Description

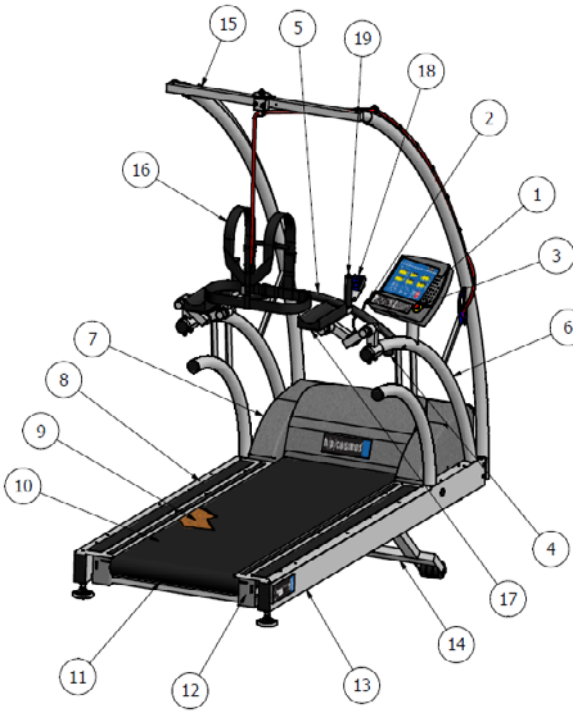
A running machine (also called “treadmill ergometer”) is an exercise device for running or walking while staying in one place. The h/p/cosmos running machines are stationary treadmills which are used for training and testing, simulating various adjustable speeds and various adjustable elevations (also called “slope” or “inclination”). The medical versions can also be used for diagnostics and therapy applications. The machine provides a moving platform with a wide conveyor belt and an electric motor. The belt moves to the rear allowing a person to walk or run an equal, and necessarily opposite, velocity. The rate at which the belt moves is the rate of walking or running. Thus, the speed of running may be controlled and measured.

The patient (for sports devices called “subject”)is asked to follow the speed of the belt and keep his position on the deck. By walking and/or running, the physical condition of the patient can be analysed through a treadmill stress test protocol and additional ECG or VO2max. (metabolic cart) diagnostic device. In physiotherapy and neurologic application the patient can be additionally secured and un-weighted with a body weight support system and the gait can be analysed and corrected under safe and reproducible conditions.

Duration of use of the medical versions is approx. 5 to 25 minutes per patient per day, depending on the prescription of the doctor, the condition of the patient and depending on the standardized or individual load protocol (for example BRUCE protocol).
The running surface areas range from 150 x 50 cm (59.0 x 19.7 inches) to 450 x 300 cm (177.2 x 118.1 inches). Max. allowed subject weight on running deck is 200 kg (440 lbs). Treadmills have handrails on both sides. Technical details are given in chapter N “Technical data” on page 146.

2.2 Device components, including software and accessories

[1] UserTerminal (cockpit) with displays and keyboard *
[2] pull cord safety stop actuator *
[3] emergency stop button (mushroom style) *
[4] heart rate measurement system (receiver board) the transmitter with chest belt * is an applied part
[5] handrail crossbar (front) *
[6] handrails (side) *
[7] motor hood/cover
[8] tread plate with slip resistant surface
[9] running surface (gliding plate/deck)
[10] running belt *
[11] rollers (behind the belt)
[12] roller cover
[13] base frame
[14] elevation element
[15] option/accessory: safety arch with fall-stop prevention
[16] option/accessory: chest-belt/harness * for safety arch
[17] option/accessory: arm support *
[18] option/accessory: keyboard for arm support *
[19] option/accessory: stop button for arm support *



h/p/cosmos quasar® med treadmill with optional safety arch with chest belt system for fall stop prevention and optional arm support for additional stabilization of the patient.

* applied parts based on definition in IEC 60601-1

h/p/cosmos® treadmills consist of a heavy duty drive system with high capacity and inverter controlled drive motor, optional elevation system for simulating gradient/elevation (uphill, optional downhill), UserTerminal (models without “lt”) with clear LCD displays and keyboard including firmware for operation, emergency stop button, interface with coscom interface protocol for possible connection to ECG or other medical devices, e.g. POLAR heart rate monitor. h/p/cosmos offers a lot of accessories and options that can be used together with the treadmill. The figure above shows an h/p/cosmos quasar med treadmill with optional safety arch with chest belt system for fall stop prevention and optional arm support for additional stabilization of the patient. Adjustable handrails, other different shaped handrails and a wheelchair ramp are also available. For further details, see chapter N “Technical data”.

The following materials are used: mainly powder coated steel tubes for the frame, conventional rubber or PVC for the running belt, conventional frequency inverter and drive motor for belt speed control, conventional LCD Display and keyboard for the UserTerminal, conventional electric and electronic components and conventional plastic parts.

Contact with the body occurs through walking shoes on the running belt, through hand palms on handrail grips when the patient holds the handrail, through chest belt if the patient wears the chest belt and harness for heart rate detection and/or for fall stop prevention, on forearms if the patient utilizes the optional arm support and through fingers if the patient is allowed to press keyboard and/or emergency stop on the UserTerminal of the device. There is no physical contact to organs, tissues or body fluids.

The h/p/cosmos para control® software is for remote control of the treadmill, loading parameters and for maintenance issues. Software products such as h/p/cosmos para graphics®, h/p/cosmos para analysis® and h/p/cosmos para motion® can be optionally applied for further data analysis and documentation, especially to be used for sports and fitness applications. The h/p/cosmos software is neither intended for medical diagnosis nor medical evaluation. The medical treadmill can support the doctor and patient when performing stress tests and movement therapy / locomotion therapy of walking and running.

In medical diagnostics and therapy, the recommended and right endurance dose of the load parameter (speed, elevation, distance, heart rate, body weight support, motion support, etc.) and specific application is decided and supervised by the doctor. A number of training profiles and standardized protocols e.g. Bruce, Naughton, Cooper, Ellestad A, Gardner, etc. are available, but the treadmill does not calculate medical parameters, nor does it perform medical diagnoses or medical evaluation. Finally, it does not give recommendations for treatment.

2.3 Safety equipment

For any use with patients or other subjects for whom a fall would constitute a serious accident (for example after hip replacement operations, patients with neurologic problems, patients connected to invasive probes, maximum load tests, running at high speeds, running side wards, co-ordination training, etc.) or injuries, a fall prevention system such as a safety arch with chest belt system and stop-function or an unweighting system (for example the h/p/cosmos airwalk) is obligatory. The chest belt secures the subject and prevents falling forward. The chest belt system is connected via a pull rope with the emergency stop at the crossbar of the safety arch. If more than approx. 8 kg / 17.6 lbs traction pulls on the harness, the switch stops the running belt immediately. The length of the harness is individually adjustable. The running belt is stopped in the moment of falling.

Unweighting systems as an accessory (for example the h/p/cosmos airwalk) can be used for body weight support of the patient, in case the patient should not bear his full body weight on his legs.

A pull cord safety stop actuator (with magnetic switch) can be attached to the subject.

The safety stop cord type and/or the safety arch with chest belt system and stop-function limits the range of motion of the subject to the front 70% of the running deck length if adjusted properly. The actuator cord should have a suitable length so that the actuator releases at a position not more than 70% of the length of the running surface. In case the subject cannot maintain the speed and falls behind to the rear 30% of the running deck length, or in case the subject falls, the safety stop cord type and/or the safety arch with chest belt system will trigger a stop function of the treadmill and will stop the running belt.

Caution! The pull cord safety stop actuator cannot prevent the subject from falling and is therefore not as safe as the safety arch with chest belt system and fall prevention or the unweighting system!

The big and highly visible emergency stop button is standard on all models and is placed on the handrail or UserTerminal for easy access. An additional emergency stop button can be retro-fitted at all h/p/cosmos running machines. It can, for example, be duplicated on the opposite handrail.

h/p/cosmos conforms with the norm EN 957-6: “The push-button type or pull cord safety stop actuator shall be in a reachable position in front of the user and in an area of ± 180 mm parallel to the centre line of the running surface. If the push-button type safety stop actuator is outside this area, it shall be duplicated on the opposite side except when a pull-cord actuator is provided.”

h/p/cosmos can supply a second and additional emergency stop button and/or pull cord safety stop actuator and/or a safety arch with chest belt system fall stop function.

On all medical treadmills the emergency stop push button is simultaneously an emergency off button. That means by pushing this button the power supply of the device is cut off.

Fall prevention system: safety arch with chest belt system and stop.

h/p/cosmos arm support with integrated additional keyboard and integrated additional stop button.

h/p/cosmos airwalk unweighting systems for body weight support, can also be used as fall prevention system.

Emergency stop button on the UserTerminal. Triggers bi-polar disconnection from the mains (power supply). Additional emergency stop push button can be mounted on the opposite handrail of the treadmill.

Safety stop pull cord actuator with waist belt.

3 Intended use / indications, contraindications, risks & forbidden use

The intended application, discussed in the following, can be performed with any h/p/cosmos medical treadmill model, although there are more or less recommended solutions. Consider obligatory safety accessories (for example unweighting systems, optional safety arch with chest belt system for fall stop prevention and optional arm support for additional stabilization of the patient, adjustable handrails, etc.) as described in the respective chapters.

3.1 Intended use / indications

- Endurance training walking and running
- Endurance tests and EMG-measuring (only with safety arch and chest belt system)
- Ergometry, exercise-ECG and ergospirometry (only with safety arch and chest belt system)
- Gait training
- Recreational fitness training
- Diagnosis and prognosis of cardiovascular disease, specifically coronary artery disease (CAD) by treadmill stress test (the treadmill is only the stress device, but does not perform diagnosis)
- Therapy of orthopaedic problems, e.g. arthritis in foot ankle, femoropatellar syndrome, knee joint problems, anterior cruciate ligament plastic
- Gait analysis and gait correction for stroke patients

Children are only allowed to use the running machine under constant supervision of a medical doctor or therapist and only when safeguarded by safety arch with chest belt system.
Additionally, h/p/cosmos recommends the use of adjustable handrails.

The correct loading form of velocity, stride length, kind of course of motion on the treadmill, elevation, duration, total distance as well as loading / unloading of the patient by an unloading system must be prescribed by a medical doctor. The treadmill manufacturer cannot make any declaration or recommendation, because the therapy depends on the patient, the clinical picture, the degree of disability and the progress of rehabilitation.

The medical treadmills may be operated only in medical facilities by medical staff.

The safety requirements in particular requirements for medical electrical equipment and medical electrical systems for medical care in a home environment (IEC 60601-1-11) - are not considered in the medical device, h/p/cosmos treadmill ergometer.

An application of the h/p/cosmos medical treadmills in a home or public environment and/or operation by persons who are not medically trained is not allowed.

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3.2 Contraindications

Contraindications have to be excluded before the treadmill is used.
It makes sense to distinguish between absolute and relative contraindications. In case of relative contraindications, the application may be started if the possible benefits exceed the risks of application. The decision has to be made by a medical doctor.

Absolute contraindications:

- Acute myocardial infarction (within 2 d)
- Instable angina pectoris
- Cardiac arrhythmia pathology and/or limited hemodynamics
- Symptomatic massive aortic stenosis
- Uncompensated / uncontrolled heart insufficiency
- Acute pulmonary embolism or pulmonary infarction
- Acute endocarditis, myocarditis, pericarditis
- Acute aortic dissection
- Acute coronary syndrome
- Acute phlebothrombosis of the lower extremities
- Febrile infections
- Pregnancy
- Acute thrombosis
- Fresh wounds e.g. after surgery
- Acute fracture
- Damaged disc or traumatic disease of the spine
- Epilepsy
- Inflammations
- Acute migraine

Relative contraindications:

- Left main coronary stenosis
- Main artery disease
- Cardiac valve disease of moderate severity
- Known electrolyte imbalance
- Arterial hypertonia (RR > 200 mm Hg syst. > 110 mm Hg diast.)
- Tachyarrhythmia or bradyarrhythmia
- Hypertrophic cardiomyopathy and other forms of outflow tract obstruction
- Higher degree atrioventricular AV-blocking
- Anemia
- Physical and/or mental disabilities leading to inability to exercise adequately

Also see following guidelines:

Deutsche Gesellschaft für Kardiologie – Herz- und Kreislaufforschung e.V. (http://leitlinien.dgk.org).

American College of Cardiology Foundation - www.acc.org

American Heart Association - www.americanheart.org
http://my.americanheart.org/idc/groups/ahaecc-internal/@wcm/@sop/documents/downloadable/ucm_423807.pdf

Further contraindications may occur. This has to be evaluated by the responsible medical doctor.

3.3 Risks

In the event of overload of the patient due to wrong application and/or wrong assessment and/or unexpected problems, the following risks, problems and injuries may occur. Risks are reduced by correct load dosing (according to the clinical picture and condition of the patient). Especially for ergometry (stress-test) application, the patient is subject to additional risk since the test is designed to stress the patient until cardiovascular problems may occur. The risk remains even in the presence of trained, medical staff and even when medical equipment and a defibrillator for reanimation are available. The higher risk cannot be reduced even with the knowledge of contraindications. Neither can loading capacity nor cognition restrictions be excluded by contraindications.

The risk of falling and consequential injuries is reduced by the safety equipment and application of a fall prevention system.

Remaining risks in ergometry / stress testing

The following complications are mentioned in the “Praxisleitlinien Ergometrie”:
(Wonisch M, Berent R, Klicpera M, Laimer H, Marko C, Pokan R, Schmid P, Schwann H. [Practice Guidelines for ExerciseTesting], J Kardiol 2008; 15 (Suppl A): 3-17)

Cardiac complications	Frequency
Morbidity	< 0.05 %
Lethal complications	0.03 – 0.04 %
Non-lethal complications	0.07 – 0.15 %
Acute MCI	0.035 – 0.1 %
Acute cardiac death	< 0.005 %
Ventricular tachyarrhythmia	0.05 % - 2.3 %
Supraventricular tachyarrhythmia - in case of known paroxysmal supraventricular arrhythmia - atrial fibrillation, atrial flutter	 3.4 – 15 % < 1 %
Ventricular extrasystoly	2 – 20 %
Supraventricular extrasystoly	4 – 24 %
Paroxysmal atrial fibrillation	0.8 %
Transient left bundle-branch block	0.4 %
Bradyarrhythmia	
Hypotony	3 – 9 %
Hypertensive blood pressure regulation	n.s.
Ventricular rupture	n.s.
Papillary muscle rupture	n.s.
Non-cardiac complications	
Intracranial haemorrhage	n.s.
Thromboembolic event	n.s.
Transient global amnesia	n.s.
Arthralgia	n.s.
Myalgia	n.s.
Low back pain	n.s.

n.s.: not specified

General Remaining risks

Overload of the patient due to wrong application and/or misinterpretation and/or unexpected problems during correct application may result in the following risks, problems and/or injuries:

Problem & injury risk	Risk control
Due to overloading and/or fall : ▌ Bruises ▌ Sprains and torns ▌ Skin abrasions ▌ Injuries of the musculoskeletal system (joints, tendons, ligaments, muscles, bones) ▌ Fractures, in worst case (e.g. broken neck) resulting in death.	▌ Note in instructions and warning labels on the UserTerminal that the device may only be used under supervision by medical or therapeutic staff. ▌ Proper loading dose must be prescribed by doctors or therapists as qualified personnel only. ▌ Note in instructions and warning labels on the UserTerminal that operating personnel must stay in permanent patient environment of 1.5 m. ▌ Recommendation and application of weight support system and/or fall stop device, such as the h/p/cosmos safety arch with harness and automatic shut-off of the running belt. ▌ Comprehensive instruction of the patient before the start of treadmill therapy with an explanation that the drive of the running belt is very strong and does not stop automatically when the patient stops.
Overload of the cardiovascular system in extreme situations with cardiac arrest and death as possible worst case scenario.	▌ Note in user's manual that correct load dosing must be done by a medical doctor or therapist. ▌ Note that a defibrillator has to be kept on hand for reanimation. This is already standard in some countries. ▌ Integrated cardio mode, which reduces the load after reaching the recommended maximum heart rate and stops the treadmill in case of overload or breakdown of the heart rate measurement.

In case of correct load dosing (according to the clinical picture and condition of the patient) and intended use, the risks are comparable to the risks of walking / running on the ground: falling off the treadmill with skin abrasions, bruises, torn ligaments, fractures and in worst case fatal injury such as a broken neck.

3.4 Forbidden use

- All prohibitions in the chapter entitled "Safety precautions, safety regulations, prohibition and warnings".
- Do not modify the running machines and do not connect them to other equipment which is not explicitly declared as compatible by all involved manufactures.
- The running machine must not be used without carefully trained specialist staff and without the staff having been instructed on the safety regulations.
- The subject must interrupt the training immediately if he/she starts feeling sick or dizzy and should see a doctor.
- Subject with a cardiac pacemaker or who suffer from any kind of physical restriction must see a doctor before using the running machine and ask for permission.
- Children and animals are not allowed to use the running machine without a supervisor (medical doctor or therapist) and must not get near to it (4 m safety zone) without a supervisor.
- Other use than the explicitly mentioned intended use.
- In the event of any detected and/or assumed malfunctions and/or defects or unreadable safety warning labels, the device has to be taken out of operation, clearly marked as such and disabled. The supplier and authorized service personnel have to be informed in writing.
- Under no circumstances should a subject/patient or other user be overloaded or overstressed.
- Under no circumstances should the device be used with increased risk, e.g. sprint or medical application with a high risk of falling, unless additional safety precautions and safety equipment such as safety arch with fall stop are used.
- The device must not be used if one or more of the listed contraindications prevail (see chapter entitled “Contraindications”).
- The automatic operation of the running machine (modes profile, cardio, test, remote control via PC and peripheral devices) is forbidden, if the health and condition of the test person / subject / patient does not permit and if a doctor has not authorized said operation. Disregarding this provision may lead to injuries, serious health problems and even death.
- It is prohibited to use wheels on the standard running machines. Thus, no cycles, wheelchairs, inline skates or roller skis are to be used. Such applications are only allowed on special running machines marked with „r“ (e.g. h/p/cosmos saturn® 300/100r). Additionally, a safety harness with fall-stop is prescribed. The bike or wheelchair brakes are to be deactivated (e.g. demount brake suspension) and the skate brakes demounted during the exercise on the running machine. Remember to reactivate brakes before using this equipment outdoor again.
- Never use running shoes or other shoes with spikes or studs on the standard running surface or running belt. These applications are only allowed on special running machines with suffix „rs“ which have an extra thick running belt. A safety arch with chest belt and fall stop is also obligatory in this case.
- h/p/cosmos devices must not be used in environmental conditions other than those specified in the chapter „Technical specifications“ and “Environmental conditions” (e.g. in wet and humid areas, swimming pools, sauna, environmental chambers, high-pressure-, low-pressure, altitude- and oxygen-chambers, etc.).
- Do not jump onto the rotating running belt. Do not jump off the rotating running belt (not even forward). Do not stop moving or turn around on the rotating running belt. Never run side wards or backwards. Do not do anything which could interfere with your balance. Do not set too high loads (speed, elevation).

If unauthorized persons are believed to have access to the running machine or if there are other reasons to lock the device, it has to be blocked for restart. See „option 40“ in chapter 5.10 ”Optional settings: User Options”. With option 41 ... 44 separate modes (manual, profile, cardio, test) can also be locked.

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4 Safety notes, warnings, precautions

4.1 General

Important notes, warnings and precautions are marked with this sign. It also reminds you of concerns which have to be considered for measurements and connection with other devices.

- These operating instructions are part of the device and must always be accessible for every user.
- Exact observance of the operating instructions is required for appropriate operation of the h/p/cosmos device.
- Before using the running machine, read carefully the operating instructions, especially the safety notes, warnings and precautions.
- The safety notes, warnings and precautions have to be pointed out to every user and operator and displayed within sight of the running machine.
- The running machine must only be used after careful instruction by authorized field service personnel and after the user has received the safety notes, warnings and precautions.
- All regulations and prohibitions are to be followed.
- Safety, reliability, function and accuracy can only be achieved if
  - the device is used in accordance with the operating instructions, including the use of the described consumables, sensors and detectors,
  - Installation, commissioning, instruction, extension, alteration, recommended preventive maintenance, safety checks and repair are performed by authorized staff.
- Any other use than that explicitly listed in the field of application is prohibited.
- Use of the h/p/cosmos medical treadmills in a home environment and/or in public and/or operation by persons who are not medically trained staff is not allowed.
- It is prohibited to use the running machine and the accessories without supervisory staff and introduction.
- Holding the handrails during exercise may affect the exercise results (e.g. heart rate, ECG, oxygen uptake, etc.). Under normal conditions and for healthy subjects we recommend holding the handrails only in case of emergency or when needed for safety or weight relief.
- Under no circumstances should the device be used with increased risk, e.g. sprint or medical application with a high risk of falling, unless additional safety precautions and safety equipment such as safety arch with fall stop are used.
- Do not deposit any clothes, towels, jewellery, etc. on the running machine. Such objects could be tripped over or caught in the rotating belt. Make sure that nobody exposes body parts, hair, clothes, ties, towels or other parts to any dangerous capture areas/gaps at moving parts such as the rollers or elevation system.
- All lubrication material and all other material or parts of this device are to be kept away from children and animals and should neither be drunk nor eaten.
- Pull the plug before cleaning or disinfecting electric devices.
- Pay special attention to all maintenance and service instructions.
- Pay special attention to all warnings and precautions in the accessory manuals.
- The field service personnel are to pay special attention to further safety notes, warnings and precautions in the service manual (see chapter 7 entitled “Service manual”).
- The manufacturer has no liability for any injury to persons or damage to property.
- In the event that a user connects standard components to support, diagnose or appraise in terms of in-house production according to the MPG (German Medical Devices Act), he creates a system and therefore has to perform and verify a simplified conformity validation process.

Disregard of intended use, safety notes, warnings and precautions, unauthorized or lack of maintenance and / or regular safety checks may lead to injuries or even death and / or can damage the device and will result in loss of any liability and warranty.

4.2 Preparation of the patient / user

- It is strongly recommended to consult a doctor before using an exercise device.
- Subjects with a cardiac pacemaker or those who suffer from any kind of physical restriction must see their doctor and get permission before using the running machine.
- Animals are not allowed to use the running machine and must not go too near (4 m distance).
- It is prohibited to use the running machine under the influence of alcohol, drugs and/or anaesthetics.
- Training or therapy must always be performed with sports or running shoes (no spikes) and sports clothing. It must never be used with bare feet.
- Harnesses, chest belts, waist belts, patients' vests, forearm arm rests, leash and cuffs are not designed for direct skin or mucous membrane contact.
- There are dangerous capture areas/gaps on the elevation system as well as at the rear end and the sides of the running belt and rollers. Upon reverse belt rotation, there are dangerous capture areas/gaps at the motor hood and the front area as well. Make sure that nobody exposes body parts, hair, clothes, ties, towels or other parts to any dangerous capture areas/gaps.
- Subjects with long hair should use a hairnet and must be made aware of the danger that hair may be caught in the capture areas/gaps.
  - at the rear end and the sides of the running belt, at the elevation system
  - in case of reverse belt rotation: at the motor hood and the front area.
- Valuable articles such as watches, emblazonments, etc. must be removed before using the device, nor should they be stored in the near vicinity of the device.
- Never use shoes with spikes or studs on the standard running surface or running belt. Spikes and studs are only allowed on special running machines with suffix „rs" which have an extra thick running belt. A safety arch with chest belt system is obligatory in this case.
- In case of reverse belt rotation, always use the pull cord safety stop actuator or better the safety arch with chest belt system since the standard safety stop buttons and keyboard as well as standard handrails and front bar handrail might not be in reach when facing the running deck backwards.

4.3 Preparation of the running machine

- When the device is used daily, we recommend switching it on in the morning and leaving it in stand-by mode during the day.
- If the running machine is at an angle of elevation > 0 when switched on, it will automatically move to position zero (display: elevation „INIT") by switching the device on. Please ensure that while driving down the elevation, no harm can be done to persons or objects under the running machine.
- The ON-/OFF intervals must not be shorter than 1-2 minutes (for models with 3-phase connection: 2-3 minutes). Otherwise it could lead to interferences and/or failure of the backup and/or data loss and/or data corruption. Too short switch on / switch off intervals lead to a deactivation of the inrush current limiter and result in an overload of the circuit fuse.
- Keep a safety zone of at least 2 m in length and the treadmills width behind the running machine and 1 x 1 m in front of the running machine. In case of reverse belt rotation, the frontal safety zone should be same size as the rear. See chapter 5.1 entitled "Operation, General".
- The crossbar handrail, safety arch harness and/or safety stop pull cord type should always be positioned in a way that the subject can walk or run in the first (front) 40% and/or second (middle) 30% of the running surface length. When the subjects moves to the rear 30% of the running deck length, the safety arch harness and/or safety stop pull cord type triggers the stop function automatically. See chapter 5.1 entitled "Operation, General".
- There must be a gap of at least 4 cm between the crossbar and the UserTerminal due to the danger of bruising.
- It is not allowed to run with the back to the crossbar.
- The front handrail crossbar should be dismounted if a safety arch with chest belt system is installed and used.

- It is prohibited to use wheels on the running surface and belt. Thus, no cycles, wheelchairs, inline skates or roller skis are to be used. Such applications are only allowed on special running machines marked with "r".
- The safety arch with chest-belt harness and fall stop is prescribed for exercise with any kind of vehicle (bikes, wheelchairs, handbikes, roller skis, etc.) on the "r" models.
- Treadmills which are not designed for cycling, wheelchairs, spikes or ski sticks, must not be used with those applications as this will result in serious damage to the treadmill.
- The bike or wheelchair brakes are to be deactivated (e.g. demount brake suspension) and the skate brakes demounted during the exercise on the running machine. Remember to reactivate brakes before using this equipment outdoor again.
- For safety reasons the wheelchair stabilizer must be dismantled before using the running machine for any application without a wheelchair (running, cycling, skating etc.). Ensure that no remaining barrier, crossbar or other part of the wheelchair stabilizer can obstruct or injure the subject.
- The subject is to be secured by a safety arch with chest belt system for fall stop in the following cases:
  - while performing sprints
  - for max. endurance tests
  - while training on running surfaces wider than 65 cm
  - for children
  - for subjects with all kind of disabilities, impairments (visual, hearing, balance, etc.), activity limitations and participation restrictions
  - while running with shoes with spikes or studs
  - during reverse belt rotation (or use the pull cord safety stop actuator)
  - during all use with wheels (cycling, wheelchair, inline-skating or roller-ski) for the "r" models
  - in case of severe danger
  - subjects with long hair or wide clothes
- The safety arch with chest belt system must be checked for wear and damage before each use. In particular, the rope, harness and all links such as the snap hook and the rope brake are to be checked.
- All wear and tear parts of the system (rope, harness and all links such as snap hook and rope brake) are to be changed immediately in case of damage.
- Only connect accessories, software and host equipment if they are approved as compatible by all involved manufacturers. Non-compliance to this clause can lead to serious injury or death and loss of manufacturer warranty and liability.

4.4 During treadmill exercise

- Use the medical running machines and accessories only under permanent supervision of your doctor or/and medical staff.
- Children are only allowed to use the running machine under constant supervision of a medical doctor or therapist and only when safeguarded by safety arch with chest belt system or an unweighting system. Additionally h/p/cosmos recommends the use of adjustable handrails.
- When using the treadmill for load tests, a medical doctor and a defibrillator are to be within reach at any time.
- Electrical equipment and a subject must never be touched by the doctor or trainer at the same time.
- The handrail crossbar should be dismounted if a safety arch with chest belt system is installed and used. Dismounting of the handrail crossbar allows more freedom of motion and is beneficial for applications where holding a front handrail crossbar is not part of the application.
- Do not lean on the UserTerminal. Do not put any pressure on the display. Press the keys softly.
- Use of the treadmill should be started with slow walking. After some minutes, the speed can be increased slowly according to the fitness level.

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- Never set too high loads (speed, acceleration, elevation, heart rate, duration, motion support, etc.) if the health and the condition of the subject/patient do not permit and a medical doctor has not authorized these loads. Disregard may cause injuries and dangerous health problems or even death. At high loads and identifiable risks, higher precautions are necessary. Under no circumstances should the test person/subject/patient be overloaded.
- The automatic operation of the running machine (modes profile, cardio, test, remote control via PC and peripheral devices) must not be employed if the health and condition of the test person / subject / patient does not permit and if a doctor has not authorized said operation. Disregarding this provision may lead to injuries, serious health problems and even death.
- For automatic operation, the subject/patient and supervisory staff have to appropriate exact knowledge of the expected loads before starting and anticipate an automatic load alternation (heart rate, speed, acceleration, deceleration, elevation and STOP) at any time. Higher precautions may be necessary. The treadmill belt will start moving automatically and the speed and elevation will be changed automatically after the automatic mode has been started. All users need to be familiar with the details and risks of these modes (e.g. the max. speed and elevation) so that there is no danger of encountering speeds which are too high and which may lead to injury.
- Do not use the cardio mode in case of detected or suspected interference of the wireless heart rate transmission.
- The subject must interrupt training immediately if he/she starts feeling sick, dizzy or feels pain. The patient should consult his/her doctor in this case.
- If the treadmill is being controlled via ECG, pay special attention to the ECG manufacturer's manual! The summary of clinical data and the risk management of h/p/cosmos does NOT cover any measured parameters and/or vital functions which are measured and/or detected by host devices (e.g. ECG, ergospirometry devices, EMG, etc.) which are connected to the treadmill.
- WARNING: Heart rate monitoring systems can be inaccurate. Incorrect and/or forbidden use and/or overtraining can lead to serious injury or death. If the user feels faint, the training must be stopped immediately.
- In case of interference of the POLAR heart rate transmitter, do not rely on the indicated values. Possible sources of interference can be screens, computers, printers, mobile phones and any radio engineering system, magnetic fields, electric devices, electric motors, transformers, high-voltage transmission lines (also from trains), strong fluorescent tubes nearby, central heating radiators, low batteries, etc.
- If an irregular pulse is displayed in spite of flawless technical condition, please check the pulse manually or, when in doubt, consult the doctor. The battery power may be low.
- Do not jump onto the rotating running belt. Do not jump off the rotating running belt (not even towards the front).
- Do not stop moving or turn around on the rotating running belt. Never run sidewards or backwards. Do not do anything which could interfere with your balance.
- The emergency stop must be within reach of the subject and the supervisory staff at all times.
- The emergency stop should only be used in an emergency, especially when there is a danger of falling. It is not to be used as a normal stop key.
- In any case of emergency, e.g. danger of stumbling and/or falling, etc: Grab the front crossbar and/or both side handrails and jump onto the foot rails (step platforms) with both feet. Press the emergency stop button immediately!
- If the treadmill is used with elevation function and the motor is switched off (e.g. by pressing the stop -button or the emergency stop button, power failure, etc.), the bodyweight of the subject and the force of gravity may cause an acceleration of the running belt. In this case, the user must not step on the rear roller when getting on or off the running surface; the gravity force might cause a movement of the running belt.

- Reverse belt rotation:
  - Turn the key-operated switch for reverse belt rotation only when the running belt is not moving.
  - Since the subject is running against the usual running belt rotation and therefore has no control of the UserTerminal, it is necessary to have a supervisor to control the running machine during the training. The models with a crossbar handrail or a motor case cover are equipped with a limited maximum speed. Use a safety arch with chest belt system for additional safety.
- If unauthorized persons are believed to have access to the running machine or if there are other reasons to lock the device, it has to be blocked for restart. See OP40 in chapter 5.10 entitled “Optional settings: User Options”.

- Special cases:
  - Elevation control after STOP:

Setting OP 41 to value 1 affects the safety of the subject and third parties. A down movement of the elevation after pressing STOP can result in confusion leading to serious injuries. h/p/cosmos strongly recommends keeping the standard setting of this option. Stop means stop for all movements and should not activate the running machine in any way. It is only allowed to change option 41 after having received written instructions regarding the dangers and after written confirmation of receipt by the customer/user.

  - Motor break:

Attention! If the device is switched off or disconnected from the power supply, the motor break will not work! After 10 seconds of operation, the motor break is released automatically and is only activated again after a belt movement. A short jerk may occur during reactivation.

4.5 Machine care

In case of any detected and/or assumed malfunctions and/or defects or unreadable safety labels, the device must be discontinued immediately. The device must be marked accordingly and its operation discontinued (e.g. by pulling the power plug and affixing a warning/defect label on the power plug). The supplier and authorised service personnel are to be informed in writing immediately.

- Damaged socket connections, wires and pressure control switches are to be replaced immediately by trained and authorised personnel.
- Fluid entering into the device is to be removed immediately by the authorized customer service and a safety check is to be performed.
- All wear and tear parts are to be replaced at least every two years or earlier if necessary due to first sign of wear and/or damage.

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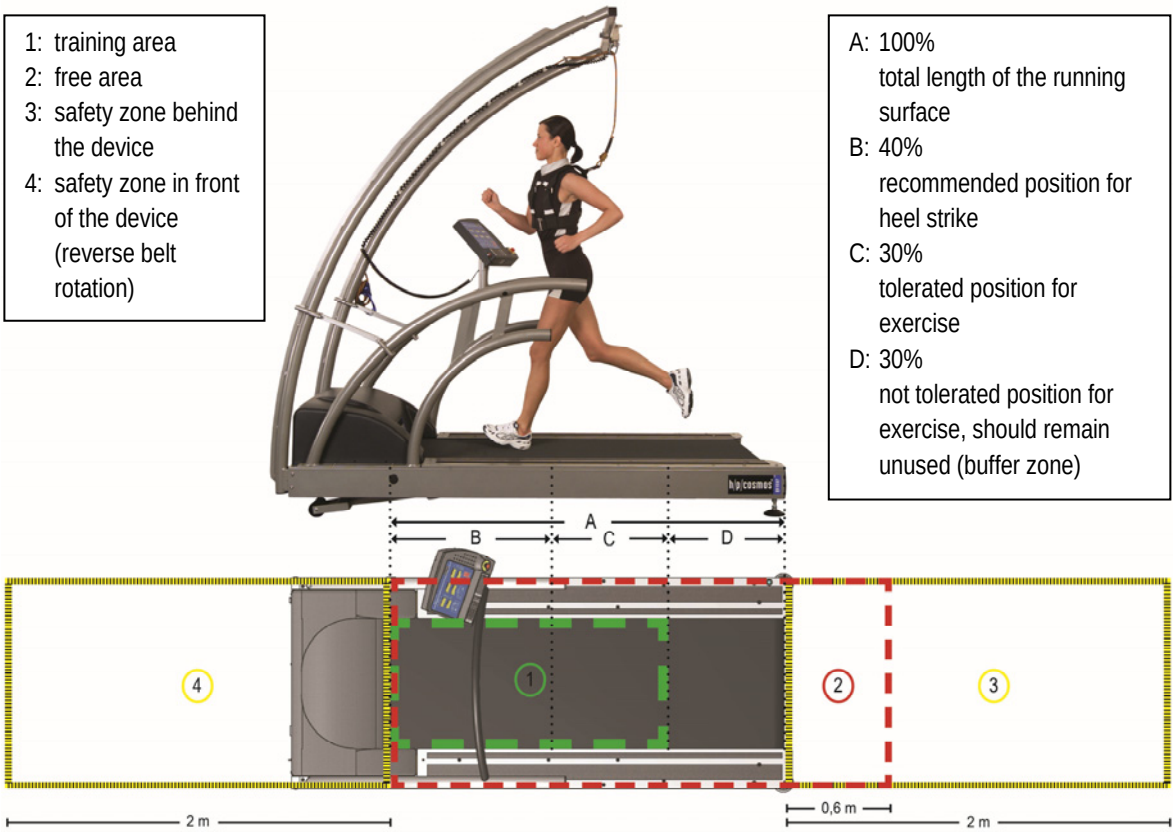
5 Operation

5.1 General

The normal position of the walking or running subject should be at the front 40% of the running deck length. As much as 70% of the front of the running deck length can be utilized. The rear 30% of the running belt length should not be used and should provide a buffer zone.
Safety devices (pull cord safety actuator, safety arch with chest belt system and stop function, unweighting systems) should be adjusted so that the subject cannot use the rear 30% of the running deck length and the automatic stop function stops the running belt.



The patient/subject is placed onto the correct position on the treadmill. Before using the treadmill, the patient/subject has to be carefully instructed to follow the speed of the running belt and to keep his position, but not hold the handrails during exercise.

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- Holding handrails may affect the exercise results (e.g. heart rate, ECG, oxygen uptake, etc.).
- Do not deposit any clothes, towels, jewellery, etc. on the running machine. Objects on the belt may be tripped over or caught in the gap during rotation of the belt.

Healthy subjects should hold the handrails only in case of emergency or for weight relief. The patient is not allowed to jump or turn around on the rotating belt. Furthermore, he/she should be informed about emergency procedures.

Depending on the prescribed or intended test or training, further devices may be necessary (e.g. heart rate transmitter, ECG or ergospirometry device). The doctor and/or the medical staff are to supervise the patient during the complete test or training. If the heart rate transmitter is used, adjust the belt length so that the belt fits tightly but is not confining. The belt should not loosen while exercising. Close the belt with the transmitter placed outwards (POLAR logo in right position). In order to allow optimal skin contact, the skin should be damp. Contact gel, as used for ECG, is an excellent moisturizer. Moisten the two electrodes and the skin with water or ECG contact gel. Place the transmitter so that it is directly below the pectoral muscle (chest), as shown in the illustration. For approximately 95 - 98 % of the subjects the "normal" placement of the transmitter belt is recommended.

For further information, see chapter 5.9.4 entitled "Cardio mode

The user selects one of the operation modes (manual, profile, cardio or test mode) of the remote control firmware and selects the prescribed test/training. The software asks the user to confirm or to change default settings. Current values (e.g. exercise time, distance and index) are displayed. A break can be selected with the “-“ key. “PAUS” is then displayed in the speed display. All current values are sustained and will be continued after restart. The test can be cancelled with the “STOP” key. At the end of the treadmill training data can be stored and/or printed, depending on selected mode, connected devices and the software version.

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5.2 Switch on procedure

5.2.1 Switch on procedure model range 150/50 up to 190/65

- If the running machine is at an angle of elevation > 0 when switched on, it will automatically move to the position zero (display elevation „INIT“). Please ensure that while lowering the elevation no harm is done to persons or objects under the running machine.
- Plug the running machines directly into the wall socket. Each running machine should be connected to a separate circuit. Mark the socket with the name and serial number of the running machine.
- The use of extension cables or multiple plug sockets is not allowed.
- Electrical devices with mains connections must neither be used in wet and humid areas (e.g. swimming pools, saunas, etc.) nor in environmental chambers.

no.	Illustration	Description
[01]		Plug the power cord of the running machine directly into the wall socket. The use of extension cables or multiple plug sockets is not allowed.
[02]		Release all emergency stop buttons of the running machine.
[03]		Make sure that the expulsion fuse at the front of the device (front terminal below the hood) is switched on.

[04]		Switch on the running machine by using the white key (until 2003 green "ON" or "I" key) at the FrontTerminal. For some models built before the year 12/2007 the location of the ON-/OFF-key may also be the UserTerminal. The indicator light within the key (push button) is illuminated. If the indicator does not flash up, please check the power supply, the expulsion fuse and the emergency stop.

Devices for sports and fitness before manufacturing date 12/2007:
The running machine can be switched on directly at the expulsion fuse on the FrontTerminal (frontal section below the hood) to the setting "stand-by mode".
If the emergency stop has been activated, a flashing notice „PULL STOP“ appears on the display.

Expulsion fuse and
main switch 2- or 3-pole

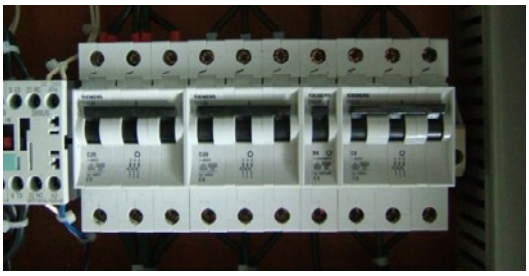
ON / OFF button
with control lamp

ON / OFF button
until 2003

5.2.2 Switch on procedure model range 200/75 up to 450/300 (venus/saturn)

- If the running machine is at an angle of elevation > 0 when switched on, it will automatically move to the position zero (display elevation „INIT“). Please ensure that while lowering the elevation no harm is done to persons or objects under the running machine.
- Plug the running machines directly into the wall socket. (Model 450/300 has permanent connection and no power plug). Each running machine should be connected to a separate circuit. Mark the socket with the name and serial number of the running machine.
- The use of extension cables or multiple plug sockets is not allowed.
- Electrical devices with mains connections must neither be used in wet and humid areas (e.g. swimming pools, saunas, etc.) nor in environmental chambers.

no.	Illustration	Description
[01]		Plug the power cord of the running machine directly into the CEE wall socket. Only the model saturn 450/300rs has a permanent connection to the mains and no power plug.

[02]		Release all emergency stop buttons of the treadmill ergometer.
[03]		In case of any problems / malfunction: Make sure that all expulsion fuses in the external switching cabinet are switched on. Opening of the device must only be performed by authorized technicians.
[04]		Switch on the running machine by using the main switch at the right side of the external UserTerminal (control unit). The main switch has to be turned 90° clockwise as shown in the picture. The main switch can be secured against unauthorized access with a padlock.
[05]		After a delay time (green light is blinking) of 1 minute the green light stops blinking and stays illuminated. Now the running machine can be powered on by pressing the “ON” push button. For models built before the year 2012 the green lamp extinguishes after the switch on delay of 1 minute.

5.3 Switch off procedure

5.3.1 Switch off procedure model range 150/50 up to 190/65

no.	Illustration	Description
[01]		Switch off the running machine by pressing the black or red “OFF” push button at the front of the device. The indicator light within the key extinguishes. For some models the location of the ON-/OFF-key may also be at the UserTerminal. Devices for sports and fitness manufactured before 12/2007 can be switched off directly with the expulsion fuse at the FrontTerminal (frontal section below the hood).

5.3.2 Switch off procedure model range 200/75 up to 450/300

no.	Illustration	Description
[01]		To switch into “stand by” mode press the black “OFF” push button.
[02]		Then switch off the running machine turn the red main switch at the right side of the external control unit. The main switch has to be turned 90° counter clockwise. The main switch can be secured against unauthorized access with a padlock.

- The ON-/OFF intervals must not be shorter than 1-2 minutes (for models with 3-phase connection: 2-3 minutes). This may otherwise lead to interference and/or failure of the backup and/or data loss and/or data corruption.
- Models for medical application with the isolation transformer have an inrush current limiter (surge guard). Too short ON/OFF intervals will lead to a deactivation of the inrush current limiter and result in an overload of the circuit fuse.
- If the device is used daily, we recommend switching it on in the morning and leave it in stand-by mode during the day.
- Press the emergency stop only in case of danger.
- The emergency stop is not to be used as a normal stop key.

5.4 Emergency Stop, stop buttons, stop functions and safety features

In case of emergency, e.g. danger of stumbling and/or falling, etc., grab the front crossbar and/or both side handrails and jump onto the foot rails (step platforms) with both feet.

The emergency stop button is to be pressed immediately!

h/p/cosmos is in compliance with the norm EN 957-6 and offers more safety features than required, as shown in the following tables. In all below mentioned cases, all displayed values will be reset to “0”.

- Use the emergency stop only if in danger.
- The emergency stop is not to be used as a normal stop key.

Type of Stop	Function	Interface communication	How to restart
Safety Stop = Emergency Stop on UserTerminal	▪ palm switch is hit ▪ running belt & inclination system stop fast ▪ machine is cut off from main power of drive motor and inclination system ▪ display, keyboard and interface inactive	interrupted during cut-off from main power	▪ wait 1 minute ▪ turn palm switch to the right ▪ push “ON” button at main power switch ▪ press START key at UserTerminal or new command via interface
Safety Stop = Emergency Stop	▪ mushroom switch is hit ▪ running belt & inclination system stop fast ▪ machine is cut off from main power of drive motor and inclination system ▪ display, keyboard and interface inactive	interrupted during cut-off from main power	▪ wait 1 minute ▪ pull mushroom switch ▪ push “ON” button at main power switch ▪ press START key at UserTerminal or new command via interface
Quick Stop models venus / saturn Emergency stop button is connected to the “quick stop port” of the UserTerminal	▪ mushroom switch is hit ▪ running belt & inclination system stop extremely fast ▪ drive motor is used to stop the running belt very fast ▪ machine is NOT cut off from main power of drive motor and inclination system ▪ display active, shows “PULL STOP” ▪ interface active, but no start, speed or elevation signal executed ▪ keyboard inactive	NOT interrupted during Quick Stop stage	▪ pull mushroom switch ▪ „pull-stop“ advice stays for 10 seconds ▪ press START key at UserTerminal or new command via interface

Quick Stop at safety arch 	▌subject wears chest belt/harness, safety rope is pulled ≥ approx. 10 kg ▌running belt & inclination system stop very fast ▌drive motor is used to stop the running belt very fast on the oversize machines venus/saturn ▌machine is NOT cut-off from main power of drive motor and inclination system ▌display active & shows “PULL STOP” ▌interface active, but no start, speed or elevation signal executed ▌keyboard inactive	NOT Interrupted during Quick Stop and/or “PULL STOP” stage	▌release weight from safety rope ▌(for venus / saturn: „pull-stop“ advice stays for 10 seconds) ▌press START key at UserTerminal or new command via interface
Pull cord safety stop actuator 	▌subject struggles, cord pulls out the magnet ▌running belt & inclination system stop fast ▌machine is NOT cut off from main power of drive motor and inclination system ▌display active, shows “PULL STOP” ▌interface active, but no start, speed or elevation signal executed ▌keyboard inactive	NOT interrupted during “PULL STOP” stage	▌reconnect magnet to its position at UserTerminal ▌press START key or new command via interface
Additional stop button for arm support 	▌Stop button is pushed ▌running belt & inclination system stop fast ▌machine is NOT cut off from main power of drive motor and inclination system ▌display active, shows “PULL STOP” ▌interface active, but no start, speed or elevation signal executed ▌keyboard inactive	NOT interrupted during “PULL STOP” stage	▌release push force from the button ▌press START key or new command through interface
Quick stop by light barriers (venus / saturn) 	▌light beam is interrupted ▌running belt & inclination system stop extremely fast ▌drive motor is used to stop the running belt very fast ▌machine is NOT cut off from main power of drive motor and inclination system ▌display active and shows “PULL STOP” ▌interface active, but no start, speed or elevation signal executed ▌keyboard inactive	NOT interrupted during Quick Stop stage	▌remove obstacle from light beam ▌„pull-stop“ advice stays for 10 seconds ▌press START key or new command through interface

5.5 UserTerminal / Control Terminal

⚠	Do not lean on the UserTerminal. Do not put any pressure on the display. Press the keys softly, as confirmation, you will hear a beep.

The oversize running machines series h/p/cosmos venus® and h/p/cosmos saturn® are equipped with an external control unit with integrated UserTerminal or TouchPanel.

"lt" models are delivered without UserTerminal. It is possible to re-fit "lt"models and to equip oversize running machines with an additional UserTerminal on the handrail (see chapter 12 entitled "Accessories and options").

External Control Terminal "control desk"

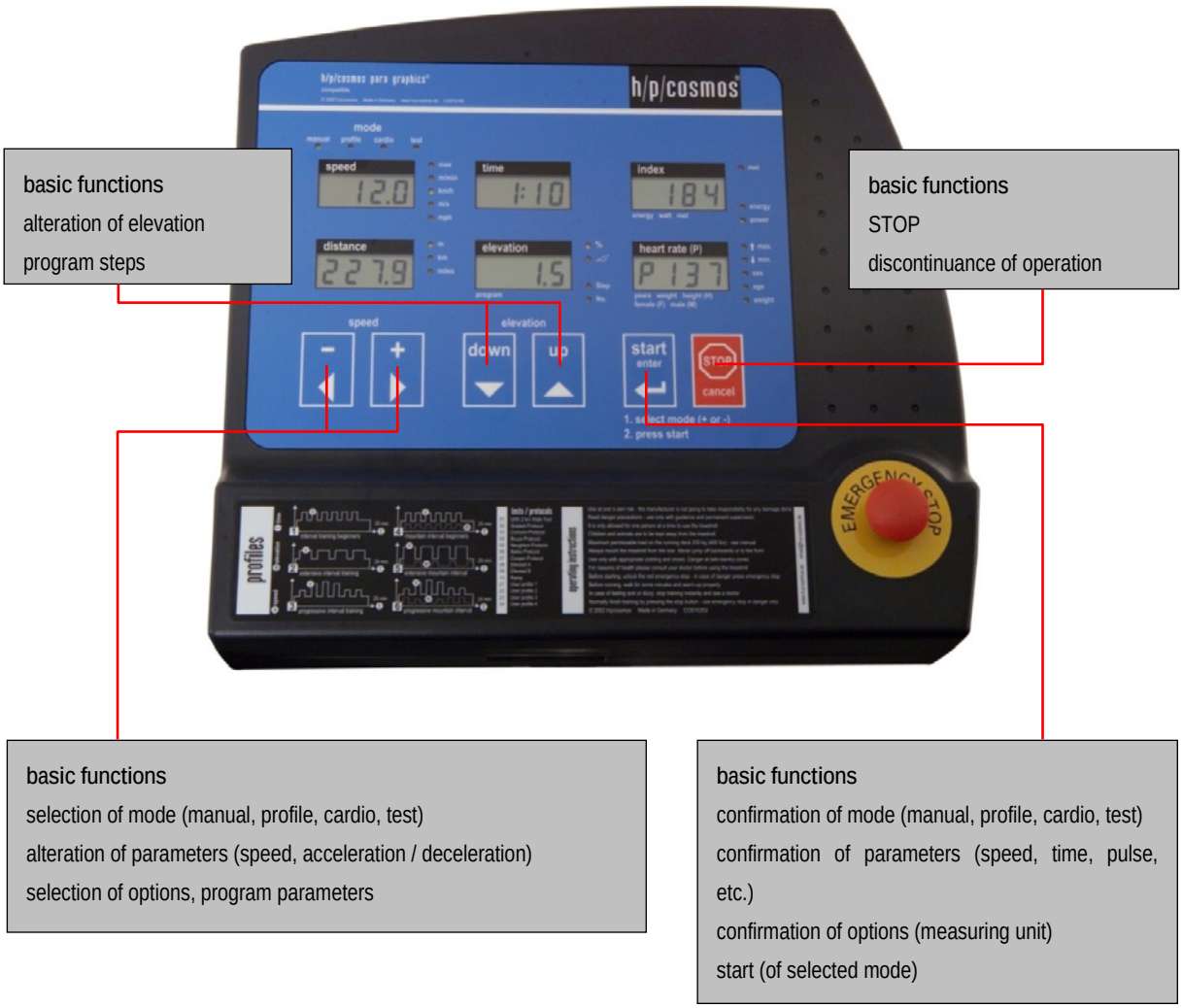
UserTerminal TouchPanel retro fit kit

If your running machine has no UserTerminal (no display, no keyboard), it can only be controlled via interface RS 232, e.g. via ECG, Ergospirometry, PC with software h/p/cosmos para graphics® or h/p/cosmos para control®. Compatible peripheral devices are listed in chapter 12 entitled "Accessories and options".

More recent computers will only have a USB interface instead of the RS232 interface. In that case, a „USB to RS232 interface adapter" is available at h/p/cosmos under order number [cos12769-01]. For control via USB interface the processor must be a Pentium 1.8 GHz or higher. To use all functions described below and for maintenance and service, we recommend the PC software h/p/cosmos para control® (Freeware).

⚠	If unauthorized persons are believed to have access to the running machine or if there are other reasons to lock the device, it has to be blocked for restart. See option "OP40" in chapter 5.10 "Optional settings: User Options". With OP 41 ... 44 you can also lock separate modes (manual, profile, cardio, test).

5.5.1 The keyboard



The keys may also have special functions within the different operation modes (see the following chapters).

The red coloured STOP button next to the START button on the UserTerminal is NOT an emergency button which is disconnecting from the mains power supply. It is not an emergency control based on IEC 60601-1:2005. In case of emergency press the big emergency stop push button (mushroom style button).

5.5.2 The display

The display consists of six four-digit LCD displays which show speed, time, index (MET, energy consumption, wattage, alternating), distance, elevation (inclination) and heart rate. Error codes and service information can also be displayed. Next to the LCD displays you will find light-emitting diodes (LED) which indicate the selected operation mode or measuring unit (LED ⊙)

Flashing displays indicate:

- select option (LED ⊙)
- alterable parameter (LCD)
- interference / error

If the running machine has been stopped by reducing the speed with the key („PAUS“-position), the displays continue with the previous values after re-starting. The indicated values remain after stopping the running machine until ...

... the running machine has been re- started with the key

... the mode (manual, profile, cardio, test) has been changed

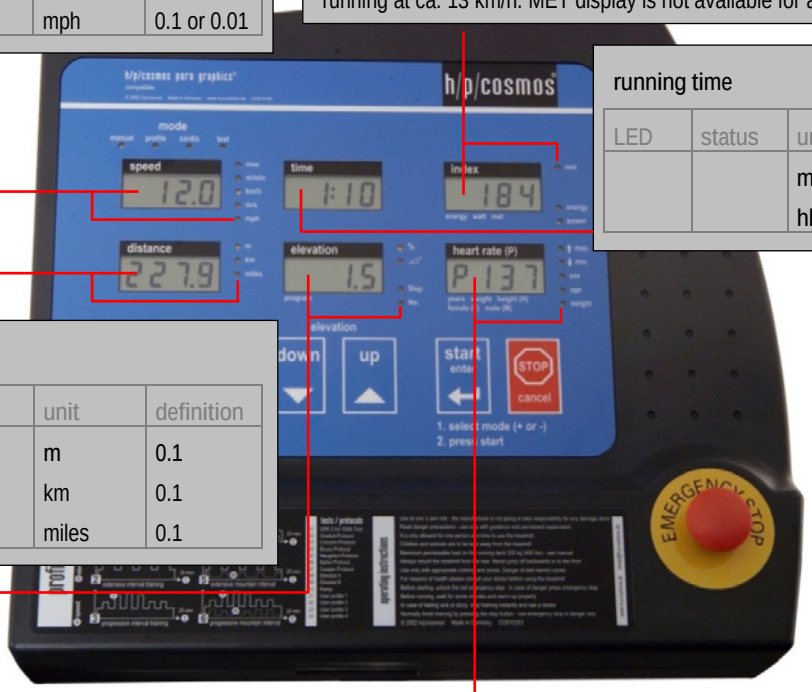
... the display has been initiated by pressing the key once more

speed

LED	status	unit	definition
max	○		
m/min	○	m/min	0.1
km/h	⊙	km/h	0.1 or 0.01
m/s	○	m/s	0.1 or 0.01
mph	○	mph	0.1 or 0.01

display	LED	status	unit	definition
MET *	MET	○	MET	0.1
energy consumption	energy	⊙	KJ	1
wattage	power	○	Watt	1
fitness-index (UKK)			Index	1

* One metabolic equivalent (MET) is defined as the consumption of oxygen during sedentary life. Two MET correspond to the consumption while walking at ca. 3.5 km/h and 8 MET correspond to the consumption while running at ca. 13 km/h. MET display is not available for all models.



running time

LED	status	unit	definition
		mm:ss	1
		hh:mm	1

running distance

LED	status	unit	definition
m	⊙	m	0.1
km	○	km	0.1
miles	○	miles	0.1

elevation

program sequence (step) / -number (no)

LED	status	unit	definition
%	⊙	%	0.1
∠	○	°	0.1
step	○		1
no	○		1

display	LED	status	unit	definition
heart rate (max.)	↑	○	1/min	1
heart rate (min.)	↓	○	1/min	1
sex	Sex	○	M/F	
	M = male			
	F = female			
age	Age	○	year	1
weight	Weight	○	kg	1
height of subject	H		cm	1

Standard configuration of the LCD displays and LEDs.

⊙ LED on / ○ LED off

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5.5.3 External UserTerminal control unit

Running machines with running surface size 200/75cm upwards have to be started using the main switch (further descriptions chapter “switch on procedure”).

elevation speed
Switch for slow or fast change of elevation
(fast: switch is blue lighted)

belt direction
Switch for forward / backward running
(backward: switch is blue lighted)

belt alignment – adjust it!
Running belt is moving outside tolerance range.
yellow lighted: belt out of tolerance
yellow blinking: belt severe out of tolerance

check power supply!
Power supply too high or low
or phase breakdown
Check only by trained and authorized technician

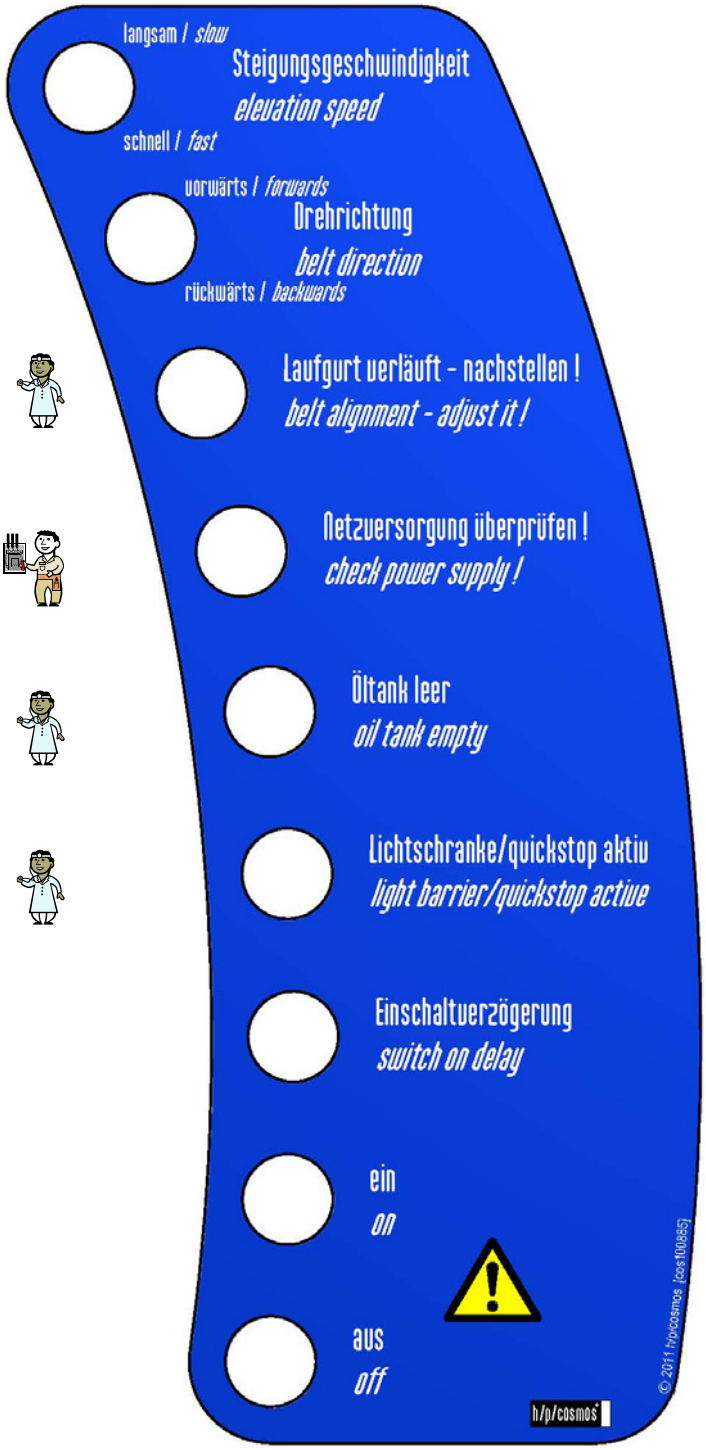
oil tank empty
Refill oil tank (see chapter 8.4.5)

light barrier / quick stop active
One or more safety features activated:
check light barrier front/back, safety arch and further safety features

switch on delay
For protection of electric components the green indicator is blinking for 1min. until device can be started (indicator is green lighted)

“on”-button
Switches the device on
(only possible after switch on delay)

“off”-button
Switches the device off
(green indicator is blinking for 1 min.)



5.5.4 TouchPanel

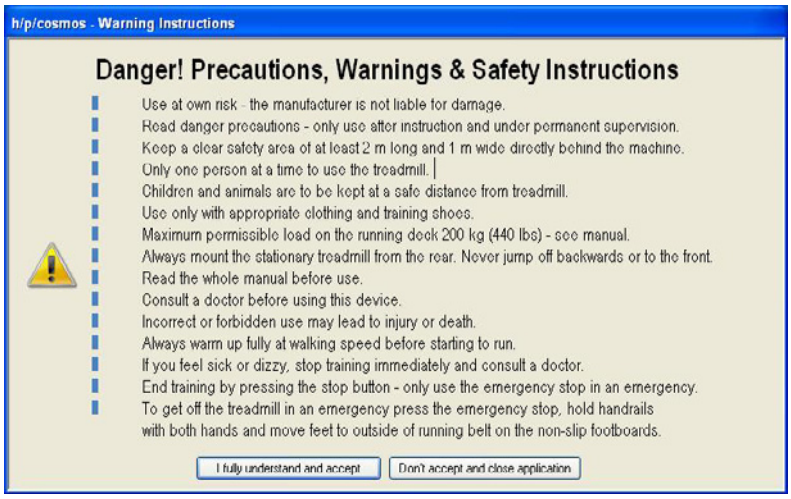
- Do not lean on the TouchPanel. Do not put any pressure on the display.
- Press the TouchPanel softly.

The operation of the TouchPanel works via the touch-sensitive surface of the screen.

The TouchPanel PC turns on automatically with the external control unit.

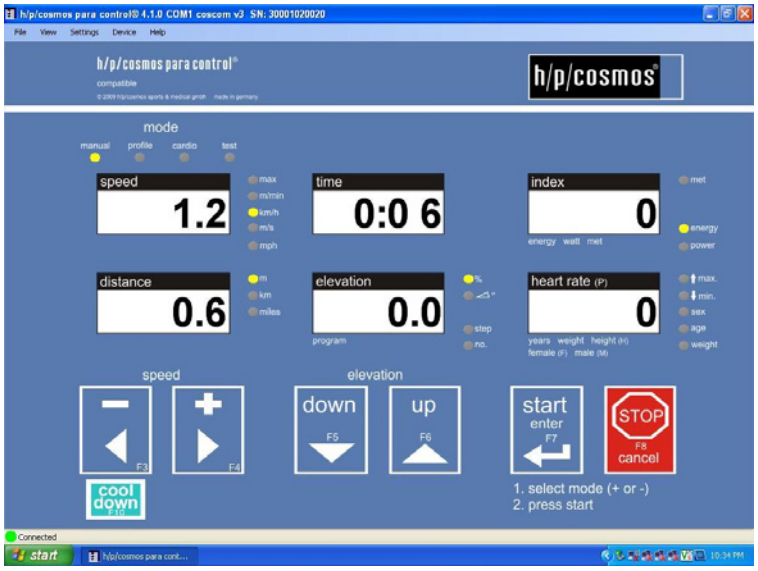
In case the TouchPanel PC does not boot up it can be switched on manually. Therefore the external control unit has to be opened in order to reach the power switch at the rear of the TouchPanel PC. Opening of the device must only be performed by authorized technicians.

After booting up, h/p/cosmos para control will start automatically and show these safety instructions.


h/p/cosmos - Warning Instructions
Danger! Precautions, Warnings & Safety Instructions
Use at own risk - the manufacturer is not liable for damage.
Read danger precautions - only use after instruction and under permanent supervision.
Keep a clear safety area of at least 2 m long and 1 m wide directly behind the machine.
Only one person at a time to use the treadmill.
Children and animals are to be kept at a safe distance from treadmill.
Use only with appropriate clothing and training shoes.
Maximum permissible load on the running deck 200 kg (440 lbs) - see manual.
Always mount the stationary treadmill from the rear. Never jump off backwards or to the front.
Read the whole manual before use.
Consult a doctor before using this device.
Incorrect or forbidden use may lead to injury or death.
Always warm up fully at walking speed before starting to run.
If you feel sick or dizzy, stop training immediately and consult a doctor.
End training by pressing the stop button - only use the emergency stop in an emergency.
To get off the treadmill in an emergency press the emergency stop, hold handrails
with both hands and move feet to outside of running belt on the non-slip footboards.
I fully understand and accept
Don't accept and close application

Before the running machine can be used, the safety instructions have to be read and confirmed with a click on the respective confirm button: “I fully understand and accept”.

The TouchPanel can be used like a physical UserTerminal as described in the chapter “UserTerminal”.



To make the software as user-friendly as possible it has been designed in exactly the same style as the physical UserTerminal of the h/p/cosmos running machine. The great advantage is that everyone who is familiar with the running machine is also able to control the machine with h/p/cosmos para control.

Furthermore there are a lot of additional functions like next target speed with a click on the speed display, next target elevation with a click on the elevation display, direct change of modes, cool down, quick stop, count-down, option settings, etc.
For details read the manual of h/p/cosmos para control.
http://www.h-p-cosmos.com/downloads/manual/20110711_cos10071-v4.0man-en_manual_h-p-cosmos_para_control_4.0.pdf

The red coloured STOP button next to the START button on the UserTerminal is NOT an emergency button which is disconnecting from the mains power supply. It is not an emergency control based on IEC 60601-1:2005. In case of emergency press the big emergency stop push button (mushroom style button).

5.6 Application: Ergometry / Cardiology ECG treadmill stress test

This test is indicated for patients who are suspected of having a cardiovascular disease (diagnostics and therapy). The benefit will be that disease of the cardiovascular system may be detected and treated early and in a controlled surrounding. The benefit of this application can only be achieved in combination with an external ECG device and diagnosis and therapy have to be performed by a medical doctor.

If controlling the treadmill via ECG, pay special attention to the ECG manufacturer's manual!
The summary of clinical data and the risk management of h/p/cosmos do NOT cover any measured parameters and/or vital functions which are measured and/or detected by host devices (e.g. ECG, ergospirometry devices, EMG, etc.) connected to the treadmill.

In order to check the reaction of the cardiovascular system to physical load, the patient is confronted with steadily increasing load on the treadmill. h/p/cosmos para control® or h/p/cosmos para graphics® offers protocols that provide an increasing load to the patient either by

- increasing velocity at constant elevation,
- increasing elevation at constant velocity or
- a combination of both.

The protocols can be selected in the "test-mode" (see chapter 5.9.5 "Test mode"). You can also create a user-defined profile, either using the "graded test" or the "freely definable user profiles".

Also see guidelines of German or American Heart Associations:
Deutsche Gesellschaft für Kardiologie – Herz- und Kreislaufforschung e. V: http://leitlinien.dgk.org
American Heart Association. http://www.heart.org and http://circ.ahajournals.org/content/96/1/345.full

5.7 Application: Gait analysis and rehabilitation with neurologic patients

Gait analysis, gait correction and rehabilitation on the treadmill is indicated for patients suffering from pathologic gait pattern, e.g. after stroke.

Neurologic gait therapy could be performed using any h/p/cosmos treadmill, but with different comfort. h/p/cosmos recommends the use of h/p/cosmos locomotion® with unweighting system "airwalk se" to perform the gait training in a controlled surrounding on the treadmill. The unweighting system prevents falling, and the duration of therapy can be increased. Arm supports and expander cables with leg cuffs (robowalk®) can be also used for support. The still adaptive neuronal system is stimulated via motion support in manual locomotion therapy, and an improvement of the motion pattern for many patients can be reached under safe circumstances. Manual locomotion therapy is the basis of physiologic treatment of neurologic patients. The patient walks on the treadmill while the therapist is sitting next to him/her, supporting and correcting the patient's motion. Only very low speed is needed; it makes sense to control the treadmill in the "manual mode" at a speed of 0.1 to 4.0 km/h.

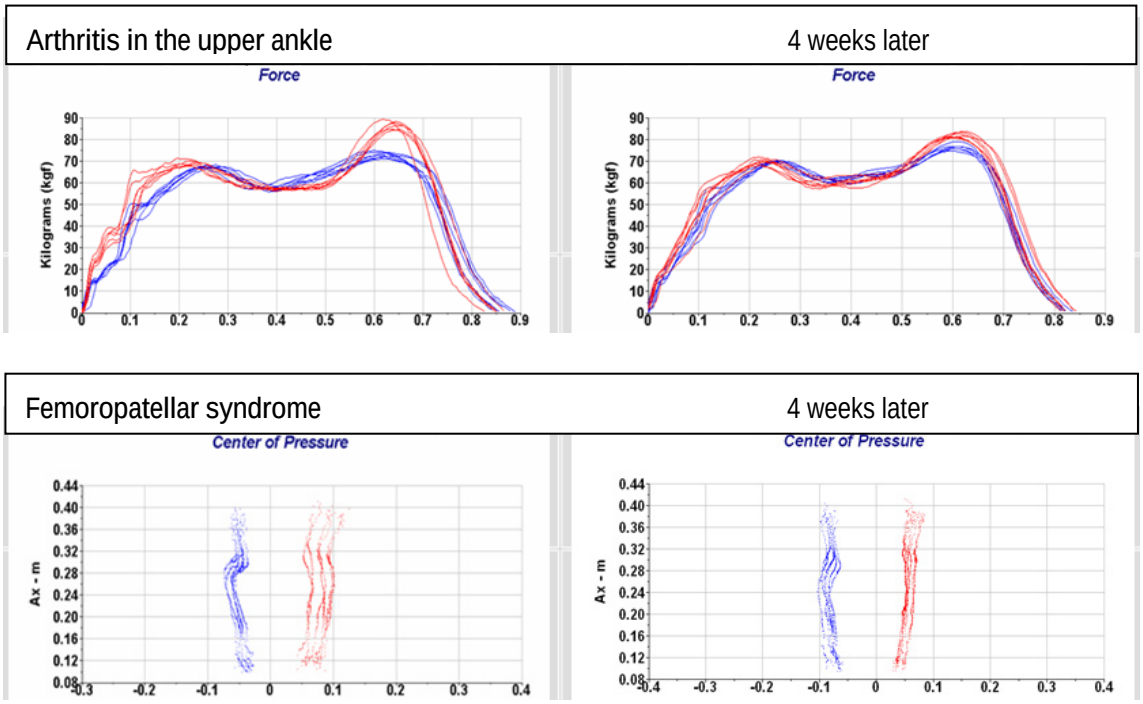
5.8 Application: Gait analysis and rehabilitation with force measurement plates

The h/p/cosmos Kistler Gaitway® is an h/p/cosmos treadmill based on the model mercury® med, equipped with two Kistler force measurement plates. It is the only h/p/cosmos treadmill with these features. The system measures the vertical ground reaction forces and thereby collects a large amount of force and time-based gait parameters. The total force path can be displayed with the Kistler Gaitway® software. Experts know how to interpret the force path and use it as basis for therapy.

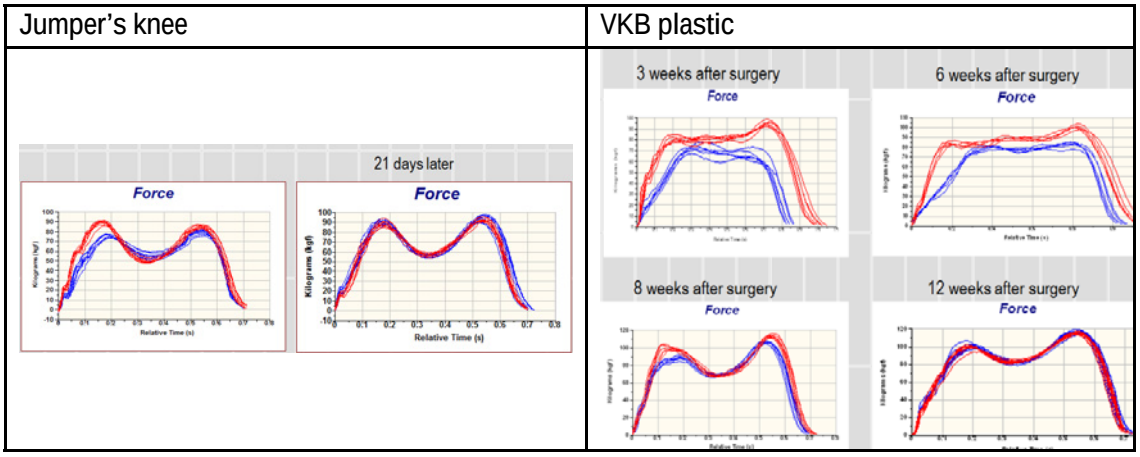
Gait analysis is indicated in the following cases:

- Pathologic gait pattern, arthritis in ankles
- Femoropatellar syndrome
- Knee joint problems
- Anterior cruciate ligament reconstruction

The following figures show four examples of the clinical benefit of h/p/cosmos gaitway® with KISTLER force plates:



After four weeks of gait therapy you can see a considerable improvement of gait symmetry, documented by comparison of the ground reaction forces.



(source: www.h-p-cosmos.com/downloads/videos/20061114_h-p-cosmos_gaitway_gait_analysis_workshop_Radovanovic_en.ppt)

Further literature about gait analysis, confirming the benefit of using treadmills: Dr. rer. medic. A. Nagel / Dr. med. A. Spitz
Instrumentale Ganganalyse – Praktische Anwendung und Versorgungsbeispiele
Versorgungsbeispiel 1: Bewegungsanalyse und Einlagen, http://www.ortholine.de/09_nagel.pdf

5.9 Modes of operation

The running machine is equipped with four modes of operation: Manual mode, profile mode, cardio mode and test mode. The automatic modes (profile mode, cardio mode and test mode) are for starting a training profile, a heart rate dependent speed and elevation control or a test profile. Each mode can be disabled by optional settings. This can be required in special cases for additional safety (for example to fully lock the device and secure against unauthorized operation) or to reduce functions for more simple operation. Switching between modes is partially possible, while the running machine is in operation (see chapter 5.9.2 “Manual mode“). The incorporated serial interface with “coscom® v3” interface protocol is always active. This means that you can send and receive data/commands at any time (parallel) and during any mode. Always the latest command will be executed, regardless of whether the command came via interface or from the UserTerminal during one of the four modes.

After switching-on, the mode has to be selected with [-] or [+] and be confirmed with [START] (see 4 LEDs).

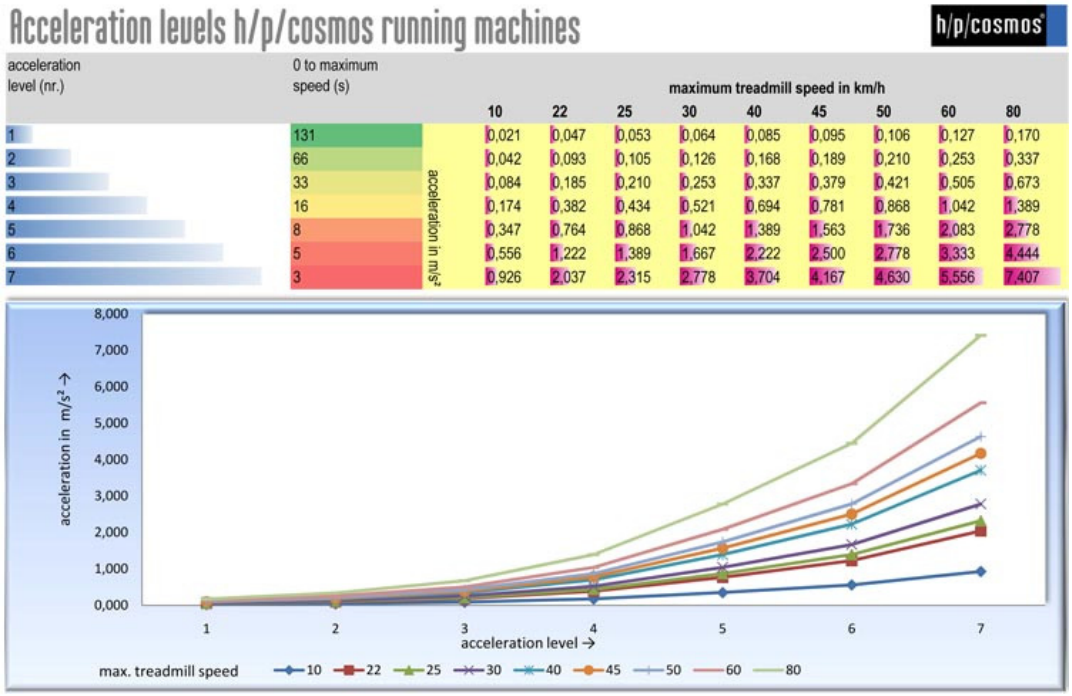
For better and easier documentation, we recommend using a printer linked to the serial interface RS 232 or/and using the software h/p/cosmos para graphics® on an external PC.

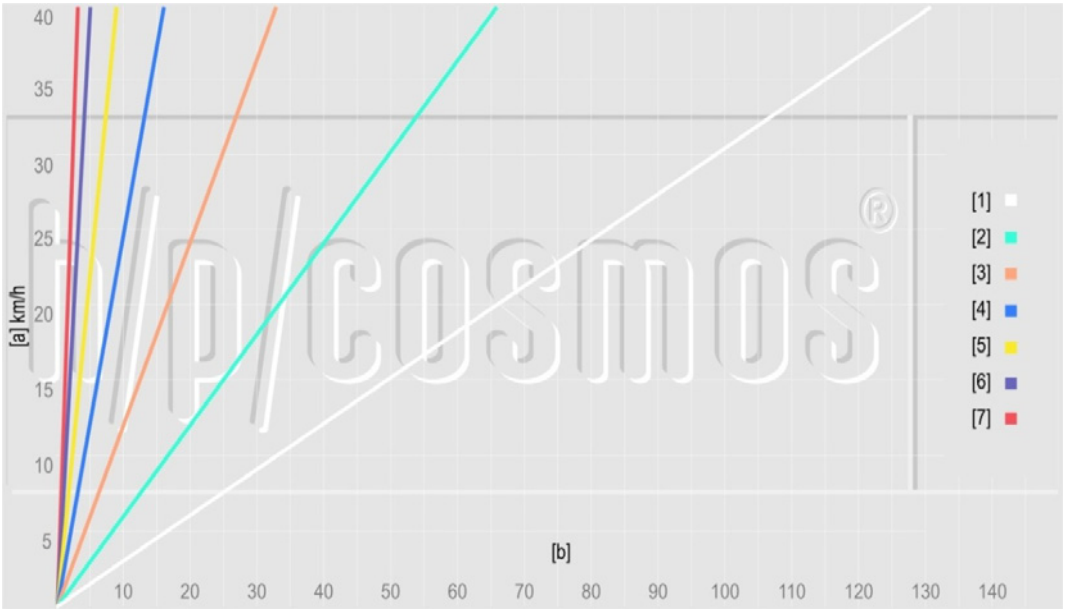
- The treadmill belt will start moving automatically and the speed and elevation will be changed automatically after an automatic mode (profile, cardio, test or control via interface) has been started. All users need to be familiar with the details and risks of these modes (e.g. the max. speed and elevation) in order to avoid the danger of too high speeds and injuries.
- Automatic operation (profile mode, cardio mode, test mode, remote control via PC and peripheral devices) is prohibited, if the health and the condition of the subject/patient do not permit and a medical doctor has not authorized the loads. Disregard may cause injuries and serious health problems or even death.
- At automatic operation, the subject/patient and supervisory staff have to impropriate exact knowledge about the expected loads before starting and anticipate an automatic load alternation (speed, acceleration, deceleration, elevation and STOP) at any time. Higher precautions may be necessary.
- Never set too high loads (heart rate, speed, acceleration, elevation, duration), if the health and the condition of the subject/patient do not permit and a doctor has not authorized these loads. Disregard may cause injuries and serious health problems or even death. Higher precautions may be necessary in the event of identifiable risks.

5.9.1 Acceleration levels

The individual selectable acceleration and deceleration parameters of speed include intensities from extremely slow to extremely fast. Top speed can be reached in any time from 3 to 131 seconds.
Seven different acceleration and deceleration levels are available for all modes and for remote control via interface and h/p/cosmos coscom® protocol (see the following diagrams). The acceleration levels are programmable for every program step of the individual profiles in the profile mode and test mode.

The acceleration levels are accessible by pressing the "speed-keys" + and minus several times and then holding the key. The acceleration levels are also accessible via interface and optional PC software h/p/cosmos para control® and h/p/cosmos para graphics®.





[a] speed in km/h, [b] time in seconds

Example:
Time to a maximum speed of 40 km/h:
Intensity (level) [1] 131 sec., [2] 66 sec., [3] 33 sec., [4] 16 sec., [5] 8 sec., [6] 5 sec. and [7] 3 sec.

- Slow acceleration (level 1 or 2) is for rehabilitation and for fitness for beginners.
- Medium acceleration (level 3 or 4) is for well-trained subjects for speeding up or slowing down relatively fast.
- High acceleration (level 5 to 7) is only for trained athletes for sprint training and other competitive sports applications. Therefore the high accelerations are only accessible via special release in the optional functions, protected by access key.

Permissible maximum and minimum acceleration levels can be limited.
See chapter 5.10 entitled “Optional settings: User Options”.

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5.9.2 Manual mode

The following table shows the operating steps for running the treadmill via firmware or software h/p/cosmos para control.

Operation of profile mode Initiation: Running belt is not moving. One of the modes LED ⊙ is flashing: (manual, profile, cardio, test)			
Step no.	Activity	Keys	Response / Display
[01]	Select manual mode	- or +	Alteration of the mode (manual, profile, cardio, test) until ⊙ manual is flashing
[02]	Start manual mode	START ENTER	A: standard (in case of deactivation in the optional functions): ⊙ manual, km/h, m and % are illuminated ⊙ met, energy and power are illuminated alternately Running belt accelerates up to the pre-selected starting speed (standard: 0.5 km/h, can be changed in the optional settings), start of measuring HEART RATE indicates present heart rate: P. 40 ... P. 220. The display indicates every single heart beat with a flashing dot behind the P. B: In case of activation in the optional functions: HEART RATE indicates: 65 flashing (for 65 kg body weight), ⊙ weight is illuminated Enter the actual body weight with - or +, then START ENTER for an accurate calculation of the POWER and ENERGY consumption. Further steps see A
[03]	Alteration of speed	- or + press and hold	Speed is being increased / reduced (0-max) If speed is being reduced to 0, PAUS is displayed SPEED. Current values will be sustained.
[04]	Alteration of acceleration/ deceleration level	- or + press and hold	Example: to select acceleration level “3”, press the corresponding key 3 times and then hold. (Standard value = 4, maximum 7 levels, may be limited by optional settings)
[05]	Pause mode	-	PAUS is displayed. SPEED. Running belt stops. All displays stop. Current values will be sustained. After restart with + or START ENTER all displayed values will be "added".
[06]	Alteration of elevation	DOWN or UP press and hold	Elevation is being increased / reduced (0 ... max.)
[07]	Switch to the next or previous mode	START ENTER + + or START ENTER + -	Switch to the next or previous mode. This is a perfect way to change the mode without stopping the belt.
[08]	Stop running belt	STOP	Running belt stops. (Deceleration time can be adjusted in the optional functions) Displayed values and selected mode remain for 2 minutes and will then be deleted (reset) automatically (or after second time pressing the stop button).

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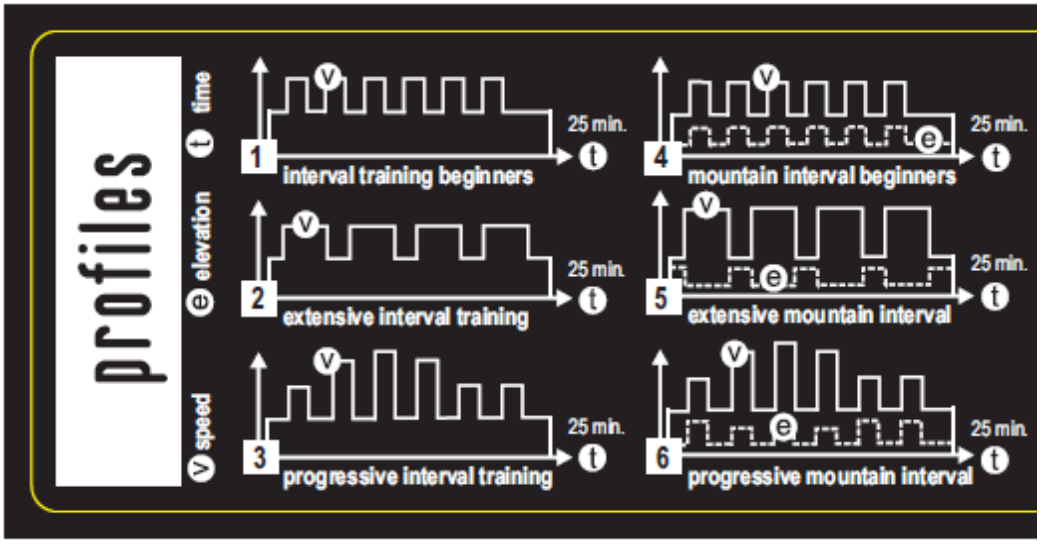
5.9.3 Profile mode

Description

The profile mode offers six different profiles, which, with the help of various speed and elevation combinations, simulate easy running training as well as a cross-country run. Each profile consists of defined program steps. All of the six profiles are predefined. They can be modified during operation, but modifications cannot be stored.
Tests no 21-28 are reserved for user-defined (freely programmable) profiles.
In case it is activated (= standard deactivated) in the user options, with OP11 the maximum speed, maximum elevation and the duration of the six profiles can be scaled in order to provide 6 x 6 x 6 (=216) variations of profiles. Standard set-up is without scaling for quicker and easier access.



Profiles 1-3 are time-dependent and without elevation, profiles 4-6 are time-dependent and with elevation. As optional feature for some models, on memory location 30...99 additional program profiles may be included. The following six tables contain the standard values, if the profiles have not been scaled. For activation of the scaling function, see chapter 5.10 entitled “Optional settings: User Options”.

Profile 1 Endurance interval for beginners	SPEED m/sec	SPEED km/h	TIME min	ELEVATION PROGRAM %
Warming up	1.8	6.5	4.0	0.0
High 1	2.5	9.0	0.5	0.0
Low 1	1.8	6.5	3.0	0.0
High 2	2.5	9.0	0.5	0.0
Low 2	1.8	6.5	3.0	0.0
High 3	2.5	9.0	0.5	0.0
Low 3	1.8	6.5	3.0	0.0
High 4	2.5	9.0	0.5	0.0
Low 4	1.8	6.5	3.0	0.0
High 5	2.5	9.0	0.5	0.0
Low 5	1.8	6.5	3.0	0.0
High 6	2.5	9.0	0.5	0.0
Low 6	1.8	6.5	3.0	0.0
			25 min	

Profile 2 Endurance interval standard	SPEED m/sec	SPEED km/h	TIME min	ELEVATION %
Warming up	2.0	7.2	5.0	0.0
High 1	2.5	9.0	3.0	0.0
Low 1	2.0	7.2	2.0	0.0
High 2	2.5	9.0	3.0	0.0
Low 2	2.0	7.2	2.0	0.0
High 3	2.5	9.0	3.0	0.0
Low 3	2.0	7.2	2.0	0.0
High 4	2.5	9.0	3.0	0.0
Low 4	2.0	7.2	2.0	0.0
			25 min	

Profile 3 Progressive interval	SPEED m/sec	SPEED km/h	TIME min	ELEVATION %
Warming up	2.8	10.1	4.0	0.0
High 1	3.2	11.5	2.0	0.0
Low 1	2.8	10.1	2.0	0.0
High 2	3.6	13.0	1.0	0.0
Low 2	2.8	10.1	2.0	0.0
High 3	4.0	14.4	1.0	0.0
Low 3	2.8	10.1	2.0	0.0
High 4	3.6	13.0	1.0	0.0
Low 4	2.8	10.1	2.0	0.0
High 5	3.2	11.5	1.0	0.0
Low 5	2.8	10.1	2.0	0.0
High 6	3.2	11.5	1.0	0.0
Low 6	2.8	10.1	4.0	0.0
			25 min	

Profile 4 Endurance interval for beginners	SPEED m/sec	SPEED km/h	TIME min	ELEVATION %
Warming up	1.8	6.5	4.0	0.0
High 1	2.5	9.0	0.5	5.0
Low 1	1.8	6.5	3.0	0.0
High 2	2.5	9.0	0.5	10.0
Low 2	1.8	6.5	3.0	0.0
High 3	2.5	9.0	0.5	10.0
Low 3	1.8	6.5	3.0	0.0
High 4	2.5	9.0	0.5	10.0
Low 4	1.8	6.5	3.0	0.0
High 5	2.5	9.0	0.5	10.0
Low 5	1.8	6.5	3.0	0.0
High 6	2.5	9.0	0.5	10.0
Low 6	1.8	6.5	3.0	0.0
			25 min	

Profile 5 Endurance interval standard	SPEED m/sec	SPEED km/h	TIME min	ELEVATION PROGRAM %
Warming up	2.0	7.2	5.0	5.0
High 1	2.5	9.0	3.0	0.0
Low 1	2.0	7.2	2.0	10.0
High 2	2.5	9.0	3.0	0.0
Low 2	2.0	7.2	2.0	10.0
High 3	2.5	9.0	3.0	0.0
Low 3	2.0	7.2	2.0	10.0
High 4	2.5	9.0	3.0	0.0
Low 4	2.0	7.2	2.0	10.0
			25 min	

Profile 6 Progressive interval / elevation	SPEED m/sec	SPEED km/h	TIME min	ELEVATION PROGRAM %
Warming up	2.8	10.1	4.0	0.0
High 1	3.2	11.5	2.0	10.0
Low 1	2.8	10.1	2.0	0.0
High 2	3.6	13.0	1.0	7.5
Low 2	2.8	10.1	2.0	0.0
High 3	4.0	14.4	1.0	5.0
Low 3	2.8	10.1	2.0	0.0
High 4	3.6	13.0	1.0	7.5
Low 4	2.8	10.1	2.0	0.0
High 5	3.2	11.5	1.0	5.0
Low 5	2.8	10.1	2.0	0.0
High 6	3.2	11.5	1.0	5.0
Low 6	2.8	10.1	4.0	0.0
			25 min	

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The following table shows the operating steps for running the treadmill via firmware or software h/p/cosmos para control®.

Operation of profile mode Initiation: Running belt is not moving. One of the modes LED ⊙ is flashing: (manual, profile, cardio, test)			
Step no.	Activity	Keys	Response / Display
[01]	Select profile mode	- ◀ or + ▶	Alteration of the mode (manual, profile, cardio, test) until ⊙ profile is flashing
[02]	Start profile mode	START ENTER ↵	⊙ profile is illuminated, ⊙ speed max. is illuminated ⊙ program no. is illuminated SPEED indicates max. speed in this profile TIME indicates duration of this profile ELEVATION PROGRAM indicates profile no. 1
[03]	Select profile no. 1 ... 6	- ◀ or + ▶	ELEVATION PROGRAM indicates selected profile no. 1 ... 6
[04]	Start the selected profile no. 1 ... 6	START ENTER ↵	A: standard (in case of deactivation in the optional functions): ⊙ profile is illuminated, ⊙ % and step are illuminated alternately ⊙ kJ and Watt are illuminated alternately Running belt accelerates up to the starting speed of the first program step. 5 seconds before the next program step there is an acoustic countdown. Start of measuring. All displays indicate the actual values. The belt stops automatically according to the profile duration. The belt can be stopped at any time with the help of STOP. B: In case of activation in the optional functions: INDEX ENERGY POWER indicates: SC 3 (scaling 1 ... 6) is flashing SPEED indicates max. speed according to the scaling (in this profile) ⊙ speed max. is illuminated TIME indicates time (duration) according to the scaling (in this profile) With - ◀ or + ▶ and then START ENTER ↵, the scaling of max. speed, elevation, time and distance can be changed. In this way more variations can be created from the 6 standard profiles. Continue with A
[05]	Stop running belt	STOP	Running belt stops. (Deceleration time can be adjusted in the optional functions)

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Possibilities of interfering within the profile mode manually Initiation: Profile mode is selected, running-belt is moving			
Step no.	Activity	Keys	Response / Display
[01]	Alteration of speed	- or + press and hold	Speed is being increased / reduced (0 - max) If speed is being reduced to 0, PAUS is displayed SPEED. Current values will be sustained. Alteration of the speed is online only for this single step. The speed cannot be changed in the memory. Next program step as defined in the profile.
[02]	Alteration of acceleration / deceleration	START ENTER press several times and then hold	Example: to select acceleration or deceleration level “3”, press the corresponding key 3 times and then hold. (Standard value = 4, maximum 7 levels, may be limited by optional settings)
[03]	Pause mode =interfere with a program step	-	SPEED indicates PAUS. Running belt stops. All displays stop. Current values will be sustained. After restart with + or START ENTER all displayed values will be added.
[04]	Alteration of elevation	DOWN or UP press and hold	Elevation is being increased / reduced (0-max.) Alteration of the elevation is online only for this single step. The elevation cannot be changed in the memory. Next program step as defined in the profile.
[05]	Switch over to the next or previous program step	START ENTER and simultaneous UP or DOWN	Jump over to the next program step, or jump to the previous program step.
[06]	Switch to the next or previous mode	START ENTER + + or START ENTER + -	Switch to the next or previous mode. This is a perfect way to change the mode without stopping the belt.

5.9.4 Cardio mode

Description

Cardio mode means heart rate controlled work load („pulse control“ cardio-training). The cardio mode controls the speed and/or elevation of the running machine, so that the heart rate of the subject stays within a predefined zone. Therefore, the subject has to wear a corresponding chest belt with heart rate transmitter.

For information and correct chest belt placement see also chapter 5 “Operation”.

Note for patients with pacemaker

The expert report from the “Herzschrittmacher-Institute in Kochel”, Germany states that a negative influence or danger for patients with implanted pacemakers is impossible. Nevertheless, we recommend all patients with pacemakers consult their doctor before using the POLAR heart rate measurement system.
Source: Herzschrittmacherinstitut, Rothenberg Süd 18, 82431 Kochel am See / Germany.

- Read all safety instructions and warnings in the instruction manual of this machine and of all accessories and options involved.
- Heart rate monitoring systems can be inaccurate.
- Overtraining can lead to serious injury or death.
- If you feel faint, stop the training immediately.
- Stop training immediately if you feel sick or dizzy, pain or in case of any other health problem and consult your doctor.
- In case of detected or suspected interference of the wireless heart rate transmission do not use the cardio mode.
- The operation of the cardio mode is prohibited if the health and the condition of the subject / patient do not permit and a doctor has not authorized these loads. Disregard may cause injuries and serious health problems.
- In automatic mode the subject/patient and supervisory staff have to impropriate exact knowledge of the expected loads before starting and anticipate an automatic load change (speed, acceleration, deceleration, elevation and STOP) at any time. Higher precautions may be necessary.

The following parameters can be programmed:

- The desired maximum heart rate (pulse) during the training
- The desired minimal heart rate (pulse) during the training
- The maximum allowed speed for the cardio mode. Elevation can be set manually during the exercise.

The running machine starts with the starting speed. In order to keep the heart rate within the pre-selected heart rate zone, the machine increases or decreases the speed automatically if necessary. The speed will not exceed the max. defined speed. If the max. speed has been reached and the heart rate of the subject is still below the target zone, the elevation will be increased to achieve the target hart rate. On the other hand, if the max. heart rate has been reached, the elevation and then the speed will be reduced in order to relieve the subject.

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If the running machine does not receive a heart rate signal when starting the cardio mode, it will start with the set starting speed and will not alter this speed. Every 30 seconds a warning signal is audible, after 1 minute the running machine cancels the mode (at MCU5 firmware-versions < V1.03.1 or MCU4 firmware-versions < V4.04.2, the running machine cancels after 2 minutes). If the heart rate signal fails during the operation in the cardio mode, the running machine will continue running in the actual set speed and angle of inclination. In this case, beeper alert signal will be activated every 30 seconds. The running machine will run down speed to 2 km/h and the mode will be terminated after 1 minute (at MCU5 firmware-versions < V1.03.1 or MCU4 firmware-versions < V4.04.2, the running machine chancels after 2 minutes).

Examples:
a) Set max. speed 4.0 km/h if you want the subject only to walk and to control the load by means of elevation.
b) Set max. speed 20.0 km/h if you want the subject to control the load by means of speed only without elevation.

The running machine adjusts speed and elevation according to the following matrix.

Chart for heart rate-controlled work load at the heart rate lower level			
Heart rate difference actual > < set value	Speed (km/h)	Elevation (%)	Time (s)
0 ... 5	0.2	0.1	25
5.1 ... 15	0.4	0.2	25
15.1 ... 30	0.6	0.4	25
30.1 ... 50	0.8	0.8	20
> 50	1.0	1.0	20

Chart for heart rate controlled work load at the heart rate upper level			
Heart rate difference actual > < set value	Speed (km/h	Elevation (%)	Time (s)
0 ... 5	0.3	0.3	12
5.1 ... 15	0.8	0.8	12
15.1 ... 30	1.0	1.0	10
30.1 ... 50	1.5	1.2	8
> 50	2.0	1.6	7

The following table show the operating steps to run the treadmill via firmware or software h/p/cosmos para control®

Operation of cardio mode Initiation: Running-Belt is not moving. One of the modes LED ⊙ is flashing: (manual, profile, cardio, test)			
Step no.	Activity	Keys	Response / Display
[01]	Select cardio mode	- ◀ or + ▶	Alteration of the mode (manual, profile, cardio, test) until ⊙ cardio is flashing
[02]	Start cardio mode	START ENTER ↵	⊙ cardio is illuminated, ⊙ speed max. is illuminated SPEED indicates 6.0 is (for max. speed during cardio mode). This default value can be changed in the optional settings. ⊙ % is illuminated, ⊙ energy is illuminated
[03]	Change max. speed for cardio mode	- ◀ or + ▶	SPEED indicates flashing: 2.0 ... max. speed of the running machine (for max. allowed speed during cardio mode) Examples: a) Set max. speed 4.0 if you want the subject only to walk and to control the load by means of elevation. b) Set max. Speed 20.0 if you want the subject to control the load by means of speed only without elevation.

[04]	Confirm max. speed for cardio mode	START ENTER	⊙ cardio is illuminated, ⊙ speed max. is illuminated SPEED indicates 2.0 ... max. speed of the machine (for max. allowed speed during cardio mode) ⊙ years is illuminated HEART RATE flashing number indicates flashing: 35 (subject's age)
[05]	Select personal age	- ◀ or + ▶	⊙ years is illuminated HEART RATE indicates flashing: 0 ... 100 (for the age) (from firmware V3.02.4: 18 ... 100)
[06]	Confirm personal age	START ENTER	⊙ ↑ is illuminated HEART RATE flashing number indicates the suggested max. level of the heart rate. Calculated with the formula: 180 minus age Important: according to your health condition and according to the advice of your medical doctor, you can/must change this level. If no changes are required, confirm the value with START ENTER
[07]	Change upper level of heart rate	- ◀ or + ▶	⊙ ↑ is illuminated HEART RATE flashing number indicates max. level of the heart rate
[08]	Confirm upper level of heart rate	START ENTER	⊙ ↓ is illuminated HEART RATE flashing number indicates the suggested min. level of the heart rate. Calculated with the formula: max. level of heart rate minus 10
[09]	Change lower level of heart rate	- ◀ or + ▶	⊙ ↓ is illuminated HEART RATE flashing min. level of the heart rate
[10]	Confirm lower level of heart rate and start of the running belt	START ENTER	Running belt starts from 0 up to a speed of 0,5 km/h ⊙ cardio is illuminated ↓ or ↑ is illuminated, indicating that the present heart rate is too low or too high HEART RATE indicates present heart rate: P. 40 ... P. 220. The display indicates every single heart beat with a flashing dot behind the P. Speed and elevation of the running machine is controlled automatically (see separate table).
[11]	Stop running belt	STOP	Running belt stops. (Deceleration time can be adjusted in the optional functions)

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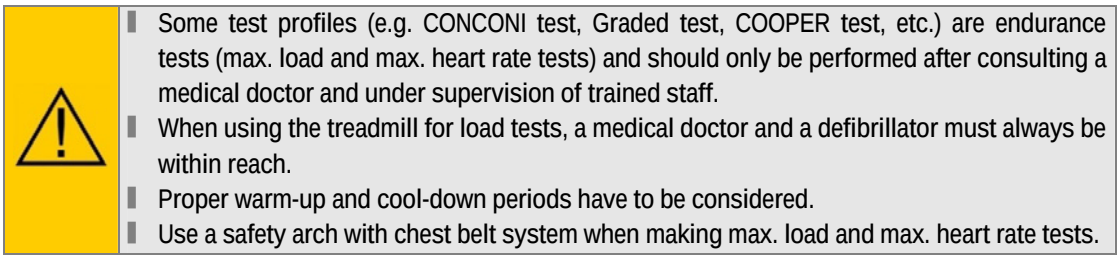
Possibilities of interfering within the cardio mode manually Initiation: Cardio mode is selected. Running belt is moving.			
Step no.	Activity	Keys	Response / Display
[01]	Alteration of speed Alteration of the speed automatically changes the allowed max. speed during cardio mode	- or + press and hold	SPEED indicates 0 ... max. speed of the machine (for max. allowed speed during cardio mode) Examples: a) Set max. speed 4.0 if you want the subject to walk and control the load by means of elevation. b) Set max. speed 20.0 if you want the subject to control the load by means of speed without elevation. If speed is being reduced to 0, PAUS is displayed. SPEED. Current values will be sustained.
[02]	Pause mode - Interfere with the cardio mode	-	SPEED indicates PAUS, running belt stops. All displays stop. Current values will be sustained. After restart with + or START all displayed values will be "added".
[03]	Alteration of elevation	DOWN or UP press and hold	Elevation is being increased / reduced (0-max.) Important: Alteration of the elevation can have impact on the heart rate of the subject and therefore can result in compensation via automatic speed control.
[04]	Changing the max. level of heart rate	START and simultaneously UP or DOWN	⊙ ↑ is illuminated HEART RATE indicates the max. ↑ level of the heart rate / the min. ↓ level of heart rate is automatically changed within the selected range.
[05]	Switch to the next or previous mode	START + + or START + -	Switch to the next or previous mode. This is a perfect way to change the mode without stopping the belt.

5.9.5 Test mode

Test mode provides several pre-defined tests. Eight tests can additionally be defined and stored by the user. The first 11 tests represent standard ergometric tests. Furthermore, six training profiles, a walk protocol, profiles VO2/10k, VO2/11k, VO2/12k, VO2/14k, profile Super Balke and test profiles 90-94 are available. They are described in detail in the following chapters.
The UKK walk test (no. 1) is the only test where the running machine makes a calculation and an evaluation (Fitness Index, but not for medical evaluation!). All other test profiles only control the load. There is no automatic evaluation done by the running machine. The evaluation is to be done by host equipment (e.g. ECG, ergospirometry, etc.) or external PC software.



- Some test profiles (e.g. CONCONI test, Graded test, COOPER test, etc.) are endurance tests (max. load and max. heart rate tests) and should only be performed after consulting a medical doctor and under supervision of trained staff.
- When using the treadmill for load tests, a medical doctor and a defibrillator must always be within reach.
- Proper warm-up and cool-down periods have to be considered.
- Use a safety arch with chest belt system when making max. load and max. heart rate tests.

The following table shows the operating steps to run the treadmill via firmware or software h/p/cosmos para control

Operation of test mode Initiation: running machine is in standby mode. ⊙LED mode is flashing.			
Step no.	Activity	Keys	Response / Display
[01]	Select test mode	- ◀ or + ▶	Selection of mode (manual, profile, cardio, test) until ⊙ test is flashing
[02]	Confirm test mode	START ENTER ↵	ELEVATION PROGRAM indicates program no. Pr. 1 is flashing
[03]	Select test number	- ◀ or + ▶	ELEVATION PROGRAM indicates program no. Pr. 1 ... "Pr. 28" is flashing ⊙ № is illuminated № 01 ... 11 predefined № 12 ... 20 reserved № 21 ... 28 user defined (free programmable profiles)
[04]	Confirm selected test	START ENTER ↵	Display and reaction depend on the selected type of program / test profile
[05]	Stop test and running belt	STOP	Running belt stops. (Deceleration time can be adjusted in the optional functions)

Possibilities of interfering within test mode manually Initiation: Test mode is selected, running belt is moving.			
Step no.	Activity	Keys	Response / Display
[01]	Alteration of speed	- or + press and hold	Speed is being increased / reduced (0 - max.) Speed is being increased / reduced (0 - max) If speed is being reduced to 0, PAUS is displayed. SPEED. Current values will be sustained. Only valid for the current program step, no alteration in the memory. Next program step as defined in the test.
[02]	Alteration of elevation Not activated in every test	DOWN or UP press and hold	Elevation is being increased / reduced (0 - max.) Only valid for the current program step, no alteration in the memory. Next program step as defined in the test.
[03]	Alteration of acceleration level (only during increase or decrease of speed)	press several times START ENTER	Example: For acceleration or deceleration level “3”, press the corresponding key 3 times and then hold. Note: Maximum 7 levels, limited by the maximum acceleration level selected in the optional settings / standard value = 4. During deceleration, this function alternates the degree of deceleration.
[06]	Switch to the next or previous mode	START ENTER + + or START ENTER + -	Switch to the next or previous mode. This is a perfect way to change the mode without stopping the belt.

5.9.5.1 Standard ergometric tests

1. UKK walk test

The UKK walk test (no. 1) is a fitness test with evaluation and display of fitness index.

Attention: Before starting the UKK walk test, it is important to do some warm-up exercises and determine your personal maximum walking speed. Walk for 2 km as fast as possible, but do not run. It is important to keep the walking speed as high as possible to achieve 80% of the max. heart rate (220 – age). The test duration and heart rate are measured immediately after finishing the 2 km distance. h/p/cosmos devices measure the heart rate every 500 m for higher accuracy. As soon as the 2 km distance has been absolved, the UKK fitness index is indicated.

The calculation of the UKK fitness index is described in chapter 15.1 entitled “Calculation of the UKK Fitness Index”.

For correct calculation of the UKK fitness index, the following parameters have to be entered: gender, age, weight and height. The following table shows the operating steps to run the treadmill via firmware or software h/p/cosmos para control®.

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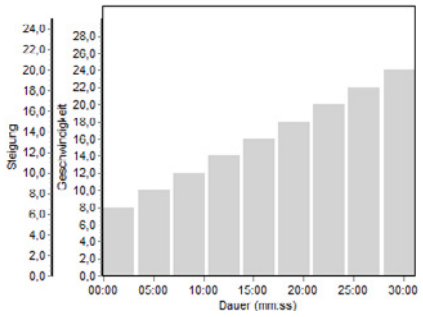
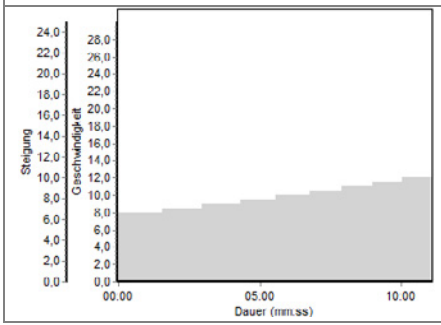
Operation of the UKK walk test Initiation: running machine is in standby mode. ⊙LED mode is flashing.			
Step no.	Activity	Keys	Response / Display
[01]	Select test mode	- ◀ or + ▶	Selection of mode (manual, profile, cardio, test) until ⊙ test is flashing
[02]	Confirm test mode Note: The running machine operates as in manual mode, the UP/DOWN-keys are in operation.	START ENTER ↵	ELEVATION PROGRAM indicates program no. "Pr. 1 " is flashing
[03]	Confirm test program no 1 (UKK walk test)	START ENTER ↵	⊙ Sex is illuminated, HEART RATE SEX AGE WEIGHT indicates sex: M (male) flashing
[04]	Select female	- ◀ or + ▶	⊙ Sex is illuminated HEART RATE SEX AGE WEIGHT indicates sex: F (female) flashing
[05]	Confirm female	START ENTER ↵	⊙ Age is illuminated, HEART RATE SEX AGE WEIGHT indicates age: 35 flashing
[06]	Select age 30 years	- ◀ or + ▶	⊙ Age is illuminated, HEART RATE SEX AGE WEIGHT indicates age: 30 flashing
[07]	Confirm 30 years	START ENTER ↵	⊙ Weight is illuminated. HEART RATE SEX AGE WEIGHT indicates weight: 65 flashing
[08]	Select weight 55 kg	- ◀ or + ▶	⊙ Weight is illuminated HEART RATE SEX AGE WEIGHT indicates weight: 55 flashing
[09]	Confirm 55 kg	START ENTER ↵	HEART RATE SEX AGE WEIGHT indicates height: H175 flashing
[10]	Select height 170 cm	- ◀ or + ▶	HEART RATE SEX AGE WEIGHT indicates height: H170 flashing
[11]	Confirm 170 cm	START ENTER ↵	The running machine starts SPEED indicates speed: 0.0 flashing
[12]	Select personal max. walking speed	- ◀ or + ▶	HEART RATE SEX AGE WEIGHT indicates present heart rate All other displays also indicate the present parameters. In case HEART RATE SEX AGE WEIGHT indicates: P 0 flashing and at the same time an acoustic signal appears, the running machine cannot receive the heart rate of the subject. Check heart rate transmitter.
[13]	2 km walking: Walk as fast as you can, but without running.		Automatic reduction of speed to 50 % of the selected maximum walking speed after 2 km. ⊙ INDEX is illuminated INDEX ENERGY POWER indicates UKK fitness index TIME indicates total time for the 2 km Note the index and used time.
[14]	Cool-down approx. 5 min, then stop manually.	STOP	End of the UKK 2 km walking test

The following tables describe further tests and profiles within the test mode.

2. Graded test, e.g. for determination of anaerobic threshold via blood lactate measurement + heart rate curve of the subject	
	Endurance test (max. load test) with the parameters ▌ Start speed ▌ Step length in min:sec. ▌ Increment / step height ▌ Acceleration level ▌ Break time in min:sec (e.g. for determination of an aerobic threshold by means of taking blood samples during load breaks and lactate analysis with external lactate analysing equipment. Standard load profile: ▌ Start speed: 8.0 km/h, must be changed according to the condition of the subject ▌ Step length: 3 min (can be changed) ▌ Increment: 2.0 km/h (can be changed) ▌ Acceleration level: 4 (adjustable from 1 to 5) ▌ Break time: 30 sec. (can be changed) STOP must be activated manually by the medical doctor. In an already pre-defined step test it is possible to set the pre-programmed pause times individually during the test, i.e. the pause can be prolonged or ended immediately. End pause manually: Once the test profile has reached the pause mode and the running belt has come to a halt, you can select the next program step immediately with START – either with warning sound signals at the beginning by pressing START once or without by pressing START twice. This is done independently of the pre-defined pause times and has no influence on the following run of the program, i.e. the following program steps remain unaffected. By pressing the START button, the next scheduled speed step is started. The pause can also be ended with the „+“ button. In this case the speed set depends on the point of release of the „+“ button. Prolong pause: Once the test profile has reached the pause mode and the running belt has come to halt, it is possible to freeze pause with the „-“ button, SPEED indicates PAUS To end pause you can either press START or „+“ – see: end pause manually.

3. Conconi test, e.g. for determination of anaerobic threshold via heart rate curve of the subject

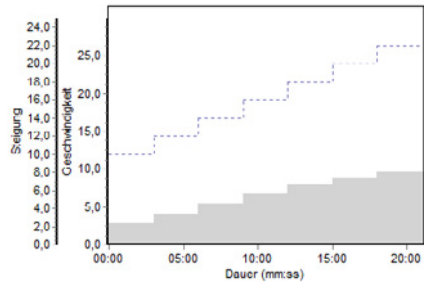


Endurance test (max. heart rate test)
Standard load profile:

- Starting speed: 8.0 km/h, must be changed according to the condition of the subject
- Circuit (lap length): 200 m (can be changed)
- Increment: 0.5 km/h (can be changed)

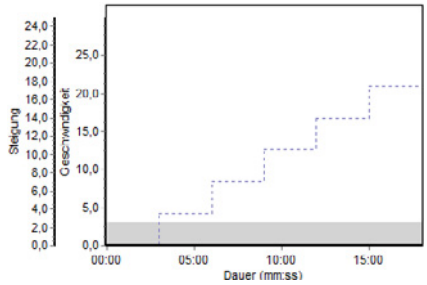
STOP must be activated manually by the medical doctor when the subject is completely exhausted.

4. Bruce protocol, e.g. for ECG stress test



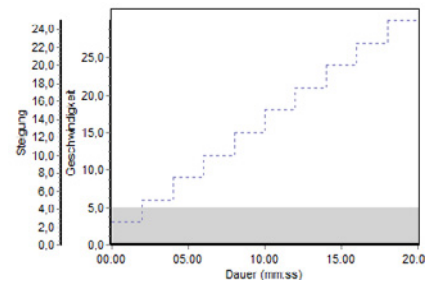
Step	Duration (min)	Speed (km/h)	Elevation (%)
1	3:00	2.7	10
2		4.0	12
3		5.4	14
4		6.7	16
5		8.0	18
6		8.8	20
7		9.6	22

5. Naughton protocol, e.g. for ECG stress test



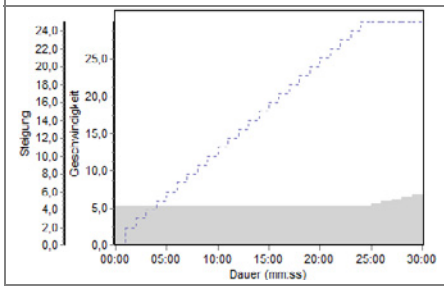
Step	Duration (min)	Speed (km/h)	Elevation (%)
1	3:00	3.0	0.0
2			3.5
3			7.0
4			10.5
5			14.0
6			17.5

6. Balke protocol, e.g. for ECG stress test



Step	Duration (min)	Speed (km/h)	Elevation (%)
1	2:00	5.0	2.5
2			5.0
3			7.5
4			10.0
5			12.5
6			15.0
7			17.5
8			20.0
9			22.5
10			25.0

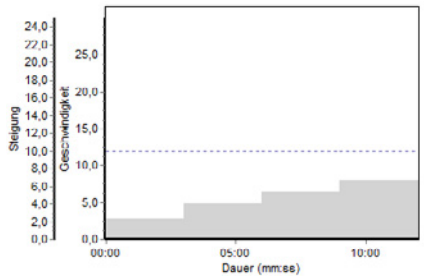
7. Cooper protocol, e.g. for ECG stress test



- Start at 5.3 km/h and 0% elevation
- after 1 minute elevation increases to 2 %
- after another minute, the elevation is increased by 1% every minute
- when elevation is 25 % elevation stays constant and the speed is increased by 0.32 km/h every minute

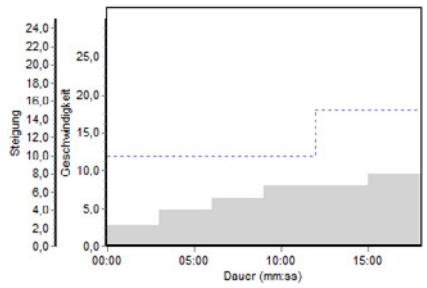
STOP must be activated manually by the medical doctor when the subject is completely exhausted.

8. Ellestad A protocol, e.g. for ECG stress test



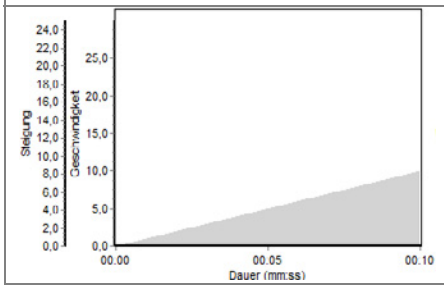
Step	Duration (min)	Speed (km/h)	Elevation (%)
1	3:00	2.7	10.0
2		4.8	
3		6.4	
4		8.0	

9. Ellestad B protocol, e.g. for ECG stress test



Step	Duration (min)	Speed (km/h)	Elevation (%)
1	3:00	2.7	10.0
2		4.8	10.0
3		6.4	10.0
4		8.0	10.0
5		8.0	15.0
6		9.6	15.0

10. Ramp profile (not available for every model)



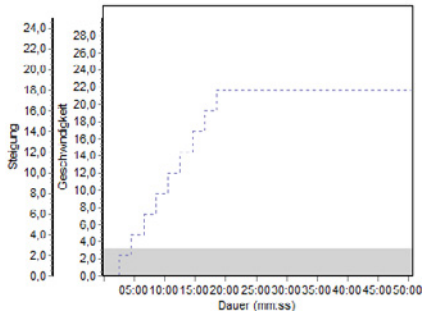
Ramp profile with 2 parameters:

- Target speed standard: 10.0 km/h; adjustable from 0 to maximum speed of the treadmill.
- Time for reaching target speed in seconds: standard: 10 seconds; adjustable from 0 to 99 seconds

11. The „Gardner test protocol“ for application in angiology

The Gardner test protocol serves to evaluate the maximum walking distance of peripheral arterial disease patients with intermittent claudication.
The test is to be performed under constant supervision of a doctor. A fall prevention system (e.g. safety arch with chest belt system) is to be used.

The patient first stands on the side footboards of the running machine and not on the belt. Start test profile 11 and the belt speeds up to 3.2 km/h. As the patient steps onto the running belt, the doctor presses the START key again. By pressing the START key the second time, the displays will be reset to zero.
After completing the test, the results can be printed on a host printer if connected.



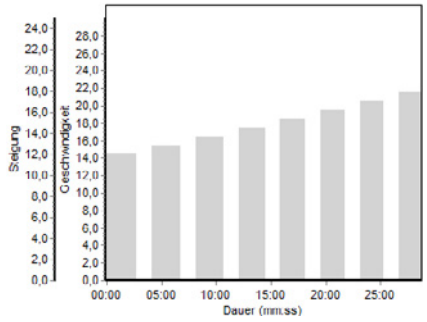
Pre-test phase: patient stands on the footboards, not on the belt.				
Step	Duration (min:sec)	Speed (km/h)	Elevation (%)	Total time (min:sec)
0	until START is pressed	3.2	0	until START is pressed
Test phase: patient steps onto the running belt.				
1	02:00	3.2	0	2:00
2	02:00	3.2	2	4:00
3	02:00	3.2	4	6:00
4	02:00	3.2	6	8:00
5	02:00	3.2	8	10:00
6	02:00	3.2	10	12:00
7	02:00	3.2	12	14:00
8	02:00	3.2	14	16:00
9	02:00	3.2	16	18:00
10	02:00	3.2	18	20:00
11	30:00	3.2	18	50:00

Tests no. 12 - 20 are reserved for the following extensions and updates.
Tests no. 21 - 28 are freely definable user profiles with maximum 40 program steps (not scaleable). See next chapter.

5.9.5.2 Additional profiles

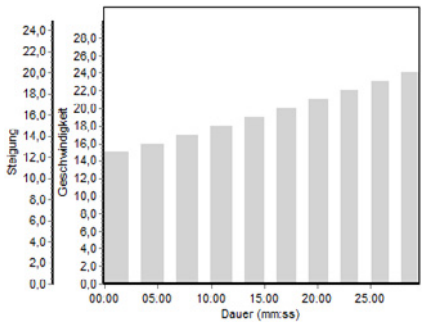
The following profiles are available from firmware 3.02.3. They are only optionally selectable and locked by default.

70. Training: Interval: 600 m / 14.5 ... 17.5 km/h



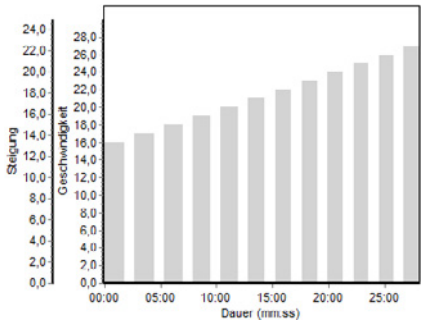
Step	Distance /time	Speed (km/h)	Elevation (%)	Acceleration level
1	600 m	14.5	0	3
2	1:30 min	0.0		
3	600 m	15.5		
4	1:30 min	0.0		
5	600 m	16.5		
6	1:30 min	0.0		
7	600 m	17.5		
8	1:30 min	0.0		

71. Training: Interval 500 m / 15.0 ... 19.0 km/h



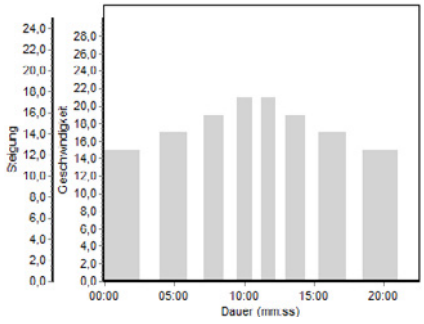
Step	Distance /time	Speed (km/h)	Elevation (%)	Acceleration level
1	500 m	15.0	0	3
2	1:15 min	0.0		
3	500 m	16.0		
4	1:15 min	0.0		
5	500 m	17.0		
6	1:15 min	0.0		
7	500 m	18.0		
8	1:15 min	0.0		
9	500 m	19.0		
10	1:15 min	0.0		

72. Training: Interval 400 m / 16.0 ... 21.0 km/h



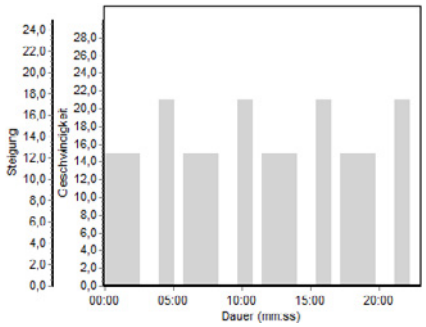
Step	Distance /time	Speed (km/h)	Elevation (%)	Acceleration level
1	400 m	16.0	0	3
2	1:00 min	0.0		
3	400 m	17.0		
4	1:00 min	0.0		
5	400 m	18.0		
6	1:00 min	0.0		
7	400 m	19.0		
8	1:00 min	0.0		
9	400 m	20.0		
10	1:00 min	0.0		
11	400 m	21.0		
12	1:00 min	0.0		

73. Training: Interval 300 ... 600 m, 15.0 ... 21.0 km/h – pyramid



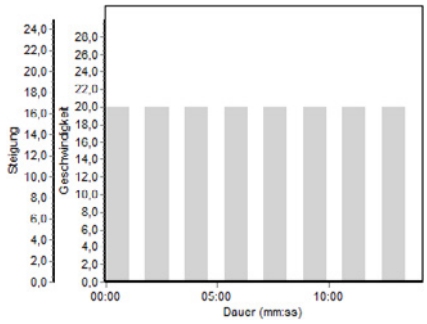
Step	Distance /time	Speed (km/h)	Elevation (%)	Acceleration level
1	600 m	15.0	0 %	3
2	1:30 min	0.0		
3	500 m	17.0		
4	1:15 min	0.0		
5	400 m	19.0		
6	1:00 min	0.0		
7	300 m	21.0		
8	0:45 min	0.0		
9	300 m	21.0		
10	0:45 min	0.0		
11	400 m	19.0		
12	1:00 min	0.0		
13	500 m	17.0		
14	1:15 min	0.0		
15	600 m	15.0		
16	1:30 min	0.0		

74. Training: Interval 300 ... 600 m, 15.0 ... 21.0 km/h



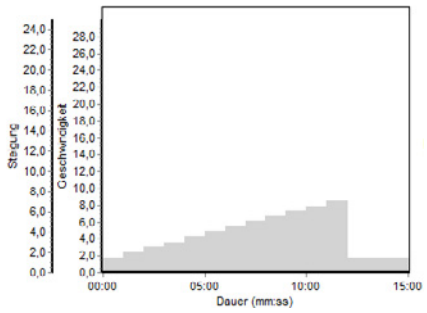
Step	Distance /time	Speed (km/h)	Elevation (%)	Acceleration level
1	600 m	15.0	0	3
2	1:30 min	0.0		
3	300 m	21.0		
4	0:45 min	0.0		
5	600 m	15.0		
6	1:30 min	0.0		
7	300 m	21.0		
8	0:45 min	0.0		
9	600 m	15.0		
10	1:30 min	0.0		
11	300 m	21.0		
12	0:45 min	0.0		
13	600 m	15.0		
14	1:30 min	0.0		
15	300 m	21.0		
16	0:45 min	0.0		

75. Training: Interval 300 m / 20.0 km/h



Step	Distance /time	Speed (km/h)	Elevation (%)	Acceleration level
1	300 m	20.0	0 %	3
2	0:45 min	0.0		
3	300 m	20.0		
4	0:45 min	0.0		
5	300 m	20.0		
6	0:45 min	0.0		
7	300 m	20.0		
8	0:45 min	0.0		
9	300 m	20.0		
10	0:45 min	0.0		
11	300 m	20.0		
12	0:45 min	0.0		
13	300 m	20.0		
14	0:45 min	0.0		
15	300 m	20.0		
16	0:45 min	0.0		

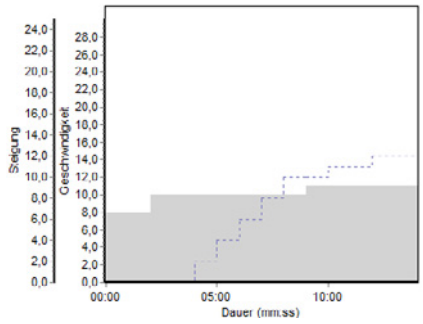
76. Walking protocol: 13 steps



Step	Time (min)	Speed (km/h)	Elevation (%)	Acceleration level
1	1:00	1.8	0	1
2	1:00	2.4		
3	1:00	3.0		
4	1:00	3.6		
5	1:00	4.3		
6	1:00	4.9		
7	1:00	5.5		
8	1:00	6.1		
9	1:00	6.7		
10	1:00	7.3		
11	1:00	7.9		
12	1:00	8.5		
13	3:00	1.8		

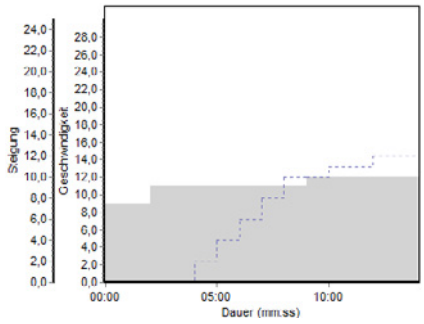
Tests no. 77 – 79 are reserved for the following extensions and up-dates

80. Profile VO2 / 10 k



Step	Time (min)	Speed (km/h)	Elevation (%)	Acceleration level
1	2:00	8.0	0	1
2	2:00	10.0	0	
3	1:00	10.0	2	
4	1:00	10.0	4	
5	1:00	10.0	6	
6	1:00	10.0	8	
7	1:00	10.0	10	
8	1:00	11.0	10	
9	2:00	11.0	11	
10	2:00	11.0	12	

81. Profile VO2 / 11 k



Step	Time (min)	Speed (km(h)	Elevation (%)	Acceleration level
1	2:00	9.0	0	1
2	2:00	11.0	0	
3	1:00	11.0	2	
4	1:00	11.0	4	
5	1:00	11.0	6	
6	1:00	11.0	8	
7	1:00	11.0	10	
8	1:00	12.0	10	
9	2:00	12.0	11	
10	2:00	12.0	12	

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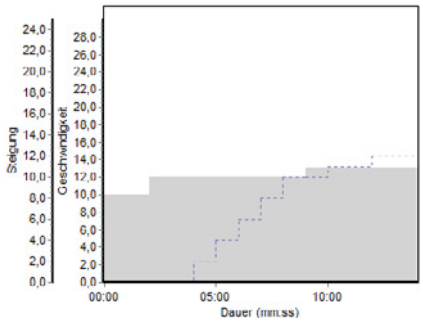
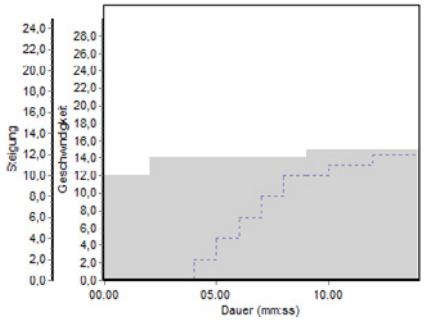
82. Profile VO2 / 12 k



Step	Time (min)	Speed (km(h)	Elevation (%)	Acceleration level
1	2:00	10.0	0	1
2	2:00	12.0	0	
3	1:00	12.0	2	
4	1:00	12.0	4	
5	1:00	12.0	6	
6	1:00	12.0	8	
7	1:00	12.0	10	
8	1:00	13.0	10	
9	2:00	13.0	11	
10	2:00	13.0	12	

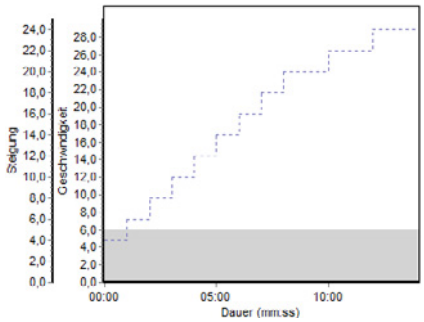
83. Not engaged / reserved for following extensions and up-dates

84. Profile VO2 / 14 k



Step	Time (min)	Speed (km(h)	Elevation (%)	Acceleration level
1	2:00	12.0	0	1
2	2:00	14.0	0	
3	1:00	14.0	2	
4	1:00	14.0	4	
5	1:00	14.0	6	
6	1:00	14.0	8	
7	1:00	14.0	10	
8	1:00	15.0	10	
9	2:00	15.0	11	
10	2:00	15.0	12	

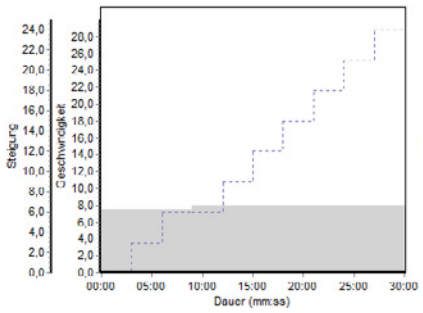
85. Profile Super Balke



Step	Time (min)	Speed (km/h)	Elevation (%)	Acceleration level
1	1:00	6.0	4	1
2	1:00		6	
3	1:00		8	
4	1:00		10	
5	1:00		12	
6	1:00		14	
7	1:00		16	
8	1:00		18	
9	2:00		20	
10	2:00		22	
11	2:00		24	

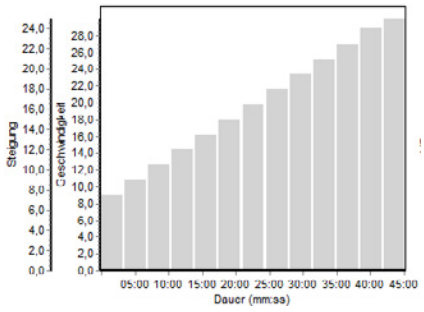
86 ... 89 Not engaged / reserved for following extensions and up-dates

90. Test profile



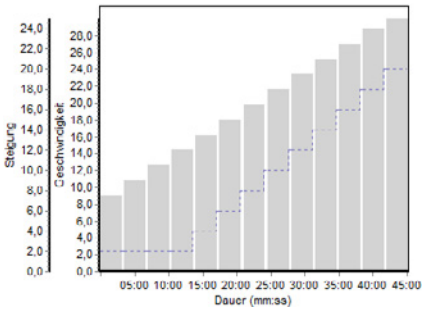
Step	Time (min)	Speed (km(h)	Elevation (%)	Acceleration level
1	3:00	7.5	0	1
2		7.5	3	
3		7.5	6	
4		8.0	6	
5		8.0	9	
6		8.0	12	
7		8.0	15	
8		8.0	18	
9		8.0	21	
10		8.0	24	

91. Test profile



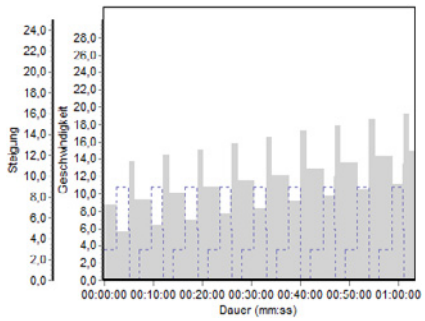
Step	Time (min)	Speed (km(h)	Elevation (%)	Acceleration level
1	3:00	9.0	0 %	1
2	0:30	0.0		
3	3:00	10.8		
4	0:30	0.0		
5	3:00	12.6		
6	0:30	0.0		
7	3:00	14.4		
8	0:30	0.0		
9	3:00	16.2		
10	0:30	0.0		
11	3:00	18.0		
12	0:30	0.0		
13	3:00	19.8		
14	0:30	0.0		
15	3:00	21.6		
16	0:30	0.0		
17	3:00	23.4		
18	0:30	0.0		
19	3:00	25.2		
20	0:30	0.0		
21	3:00	27.0		
22	0:30	0.0		
23	3:00	28.8		
24	0:30	0.0		
25	3:00	30.6		

92. Test profile



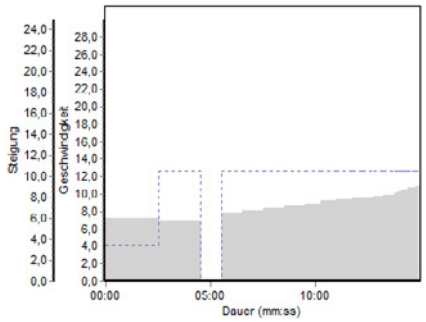
Step	Time (min)	Speed (km(h)	Elevation (%)	Acceleration level
1	3:00	9.0	2	
2	0:30	0.0	2	
3	3:00	10.8	2	
4	0:30	0.0	2	
5	3:00	12.6	2	
6	0:30	0.0	2	
7	3:00	14.4	2	
8	0:30	0.0	4	
9	3:00	14.4	4	
10	0:30	0.0	6	
11	3:00	14.4	6	
12	0:30	0.0	8	
13	3:00	14.4	8	1
14	0:30	0.0	10	
15	3:00	14.4	10	
16	0:30	0.0	12	
17	3:00	14.4	12	
18	0:30	0.0	14	
19	3:00	14.4	14	
20	0:30	0.0	16	
21	3:00	14.4	16	
22	0:30	0.0	18	
23	3:00	14.4	18	
24	0:30	0.0	20	
25	3:00	14.4	20	

93. Test profile



Step	Time (min)	Speed (km(h)	Elevation (%)	Acceleration level
1	2:30	8.7	3	3
2	2:20	5.6	9	1
3	0:10	7.8	5	1
4	1:00	13.7	0	1
5	1:00	9.4	0	3
6	2:30	9.4	3	3
7	2:20	6.3	9	1
8	0:10	8.5	5	1
9	1:00	14.4	0	1
10	1:00	10.1	0	3
11	2:30	10.1	3	3
12	2:20	7.0	9	1
13	0:10	9.2	5	1
14	1:00	15.1	0	1
15	1:00	10.8	0	3
16	2:30	10.8	3	3
17	2:20	7.7	9	1
18	0:10	9.9	5	1
19	1:00	15.8	0	1
20	1:00	11.5	0	3
21	2:30	11.5	3	3
22	2:20	8.4	9	1
23	0:10	10.6	5	1
24	1:00	16.5	0	1
25	1:00	12.2	0	3
26	2:30	12.2	3	3
27	2:20	9.1	9	1
28	0:10	11.3	5	1
29	1:00	17.2	0	1
30	1:00	12.9	0	3
31	2:30	12.9	3	3
32	2:20	9.8	9	1
33	0:10	12.0	5	1
34	1:00	17.9	0	1
35	1:00	13.6	0	3
36	2:30	13.6	3	3
37	2:20	10.5	9	1
38	0:10	12.7	5	1
39	1:00	18.6	0	1
40	1:00	14.3	0	3
41	2:30	14.3	3	3
42	2:20	11.2	9	1
43	0:10	13.4	5	1
44	1:00	19.3	0	1
45	1:00	15.0	0	3

94. Test profile



Step	Time (min)	Speed (km/h)	Elevation (%)	Acceleration level
1	2:30	7.2	3.5	1
2	2:00	6.9	10.5	
3	1:00	0.0	0	
4	1:00	7.8	10.5	
5	1:00	8.1		
6	1:00	8.4		
7	1:00	8.6		
8	0:45	8.9		
9	0:45	9.2		
10	0:45	9.4		
11	0:30	9.5		
12	0:30	9.6		
13	0:30	9.8		
14	0:30	9.9		
15	0:10	10.1		
16	0:10	10.2		
17	0:10	10.4		
18	0:10	10.5		
19	0:10	10.7		
20	0:10	10.8		
21	0:10	10.9		

5.9.5.3 Programming example: user-defined profile

User-defined profiles/tests can be programmed and modified in test mode Pr. 21 - Pr. 28. The programming example below shows programming for Pr. 21. Up to 40 program steps can be stored per program. If more program steps are required, ask for the optional PC Software h/p/cosmos para graphics®, which is able to control all functions of the running machine via host PC and also to serve for on-line monitoring of all data. During programming, the displays indicate the values of the present program step and not the value of the total distance or total time programmed so far. In case of entering a false value, or in case you want to alternate a profile, you can "scroll" the profile steps with the help of the keys UP and DOWN. With the help of the keys + and -, you can alter the values. During programming procedure the display INDEX indicates the acceleration level “Acc X” for the single program step.

The following example shows a user-defined profile with different acceleration levels. The machine speeds up at acceleration level 4 and reduces the speed to level 2 after the sprint distance of 200 meters. During programming procedure, the display HEART RATE indicates the present program step “St X”.

Sequence of profile	Step	Acceleration level	Speed (km/h) SPEED	Distance DISTANCE	Time (min) TIME	Elevation (%) ELEVATION
Warming up	1	1	5.0		5:00	0
Speed increase	2	1	8.0		2:30	0
Easy up-hill run	3	1	8.0		4:00	5
Sprint with fast acceleration	4	4	16.0	200		0
Cool-down	5	2	6.0		5:00	0
Stop	6	1	0.0		0:00	0

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Program steps of a user-defined profile (see previous page) Initiation: Running machine is in standby mode. ⊙ LED mode is flashing.			
Step no.	Activity	Keys	Response / Display
[01]	Select test mode	- ◀ or + ▶	Selection of mode (manual, profile, cardio, test) until ⊙ test is flashing
[02]	Confirm test mode	START ENTER ↵	ELEVATION PROGRAM indicates program no. Pr. 1 is flashing
[03]	Select program no.	- ◀ or + ▶ until Pr. 21	ELEVATION PROGRAM indicates program no. Pr. 21 is flashing
[04]	Confirm program no.	START ENTER ↵ for at least 5 sec.	SPEED indicates speed: 0.0 is flashing HEART RATE SEX AGE WEIGHT indicates program step St. 1
[05]	Select speed 5.0 km/h	- ◀ or + ▶	
[06]	Confirm speed	START ENTER ↵	DISTANCE indicates distance: 0 is flashing
[07]	Confirm distance 0 (this step is programmed after time)	START ENTER ↵	TIME indicates time (minutes): 0:00 is flashing
[08]	Select time 5 minutes	- ◀ or + ▶	
[09]	Confirm time	START ENTER ↵	TIME indicates time (seconds): 5:00 is flashing
[10]	Confirm time - 00 seconds	START ENTER ↵	ELEVATION PROGRAM indicates elevation: Value "0.0" is flashing
[11]	Confirm elevation 0 %	START ENTER ↵	INDEX ENERGY POWER indicates acceleration level: Acc. 1 is flashing
[12]	Confirm acceleration level 1	START ENTER ↵	SPEED indicates speed: 0.0 is flashing HEART RATE SEX AGE WEIGHT indicates program step St. 2
[13]	Select speed 8.0 km/h	- ◀ or + ▶	
[14]	Confirm speed	START ENTER ↵	DISTANCE indicates distance: 0 is flashing
[15]	Confirm distance 0 (this step is programmed after time)	START ENTER ↵	TIME indicates time (minutes): 0:00 is flashing
[16]	Select time 2 minutes	- ◀ or + ▶	
[17]	Confirm time	START ENTER ↵	TIME indicates time (seconds): 2:00 is flashing
[18]	Select time 30 seconds	- ◀ or + ▶	
[19]	Confirm time	START ENTER ↵	ELEVATION PROGRAM indicates elevation: 0.0 is flashing

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[20]	Confirm elevation 0 %	START ENTER	INDEX ENERGY POWER indicates acceleration level: Acc. 1 is flashing
[21]	Confirm acceleration level 1	START ENTER	SPEED indicates speed: 0.0 is flashing HEART RATE SEX AGE WEIGHT indicates program step: St. 3"
[22]	Select speed 8.0 km/h	- or +	
[23]	Confirm speed	START ENTER	DISTANCE indicates distance: 0 is flashing
[24]	Confirm distance 0 (this step will be programmed after time)	START ENTER	TIME indicates time (minutes):0:00 is flashing
[25]	Select time 4 minutes	- or +	
[26]	Confirm time	START ENTER	TIME indicates time (seconds): 4:00 is flashing
[27]	Confirm time 00 seconds	START ENTER	ELEVATION PROGRAM indicates elevation:0.0 is flashing
[28]	Select elevation 5 %	- or +	
[29]	Confirm elevation 5 %	START ENTER	INDEX ENERGY POWER indicates acceleration level: Acc. 1 is flashing
[30]	Confirm acceleration level 1	START ENTER	SPEED indicates speed: 0.0 is flashing HEART RATE SEX AGE WEIGHT indicates program step: St. 4"
[31]	Select speed 16.0 km/h	- or +	
[32]	Confirm speed	START ENTER	DISTANCE indicates distance: Value "0" is flashing
[33]	Select distance 200 m (this step will be programmed after time)	- or +	
[34]	Confirm distance	START ENTER	ELEVATION PROGRAM indicates elevation: 0 is flashing
[35]	Confirm elevation 0 %	START ENTER	INDEX ENERGY POWER indicates acceleration level: Acc. 1 is flashing
[36]	Select acceleration level 4	- or +	
[37]	Confirm acceleration level	START ENTER	SPEED indicates speed: 0.0 is flashing HEART RATE SEX AGE WEIGHT indicates program step: St. 5
[38]	Select der Speed 6.0 km/h	- or +	

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[39]	Confirm speed	START ENTER	DISTANCE indicates distance: 0 is flashing
[40]	Confirm distance 0 (this step will be programmed after time)	START ENTER	TIME indicates time (minutes): 0:00 is flashing
[41]	Select time 5 minutes	- or +	
[42]	Confirm time	START ENTER	TIME indicates time (seconds): 5:00 is flashing
[43]	Confirm time 00 seconds	START ENTER	ELEVATION PROGRAM indicates elevation: 0.0 is flashing
[44]	Confirm elevation 0 %	START ENTER	INDEX ENERGY POWER indicates acceleration level: Acc. 1 is flashing
[45]	Select acceleration level ("deceleration") 2.	- or +	In this program step the speed will be reduced from 16 km/h to 6 km/h at an acceleration level 2
[46]	Confirm acceleration level	START ENTER	SPEED indicates speed: 0.0 is flashing HEART RATE SEX AGE WEIGHT indicates program step: St. 6
[47]	Confirm stop-speed 0 km/h and save program file	START ENTER for more than 5 seconds	End of programming. The profile can be started later on in test mode Pr. 21

5.10 Optional settings: User Options

Optional settings serve for example as confirmation of error notes on the display, or for the standard setting of the device: selection of RS232 interface protocol, etc. For optional settings on devices without UserTerminal, an external UserTerminal or a connected PC with the software h/p/cosmos para control® is required.

Select user options Initiation: Running belt is not moving. One of the modes LED ⊙ is flashing: (manual, profile, cardio, test)			
Step no.	Activity	Keys	Response / Display
[01]	Select option mode (OPxx) for users Note: The option mode for administrators is only accessible for authorised service technicians, not for users	 and simultaneously and simultaneously for at least 3 seconds.	indicates: OP 01 flashing (for option no. 01) and indicating: E.rE SEt (for error reset)
[02]	Select option no. 01 ... 53	or	indicates: OP 01 ... OP 53 flashing and indicate: a short explanation of the option, e.g.: E.rE SEt (for Error reset)
[03]	Confirm option no.		Read, confirm and set options according to the following option list. All adjustable values are going to be shown flashing. All non-adjustable values are not going to be shown flashing.
[04]	Example: OP 01 (OIL & other error codes): Confirmation & deleting by pressing:		Display indicates: donE (confirmation)
[05]	Example: OP 02 (Distance / km): Confirmation by pressing		
[06]	Example: OP 08 (STOP-time / "slow-down-time"): a) change value by pressing b) confirm value by pressing	a) or b)	

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List of user options/optional functions		
Option	Description	Comment / Display
OP01	Reset (deleting) of error messages Note: This option resets exclusively the causing variable. If for example the E.02 service-time-interval is being set back with this operation, the distance-interval is not set back and vice versa! Only administrator option OP 47 resets all three values simultaneously.	The required maintenance work has to be performed before deleting error messages. The h/p/cosmos service department has to be contacted before one of the service displays or error codes will be deleted! Confirmation on display DISTANCE indicating "donE" Info: This option only sets back the error message! If the error still exists, you are not able to set back the error message. In this case consult an authorised service engineer The following intervals are set back by this operation: E.01: Oil-interval A-OP 35 E.02: Service-time-interval A-OP 37 E.02: Service-distance-interval A-OP 38
OP02	Total distance covered (km)	DISTANCE and ELEVATION indicates: total distance covered in km HEART RATE indicates km
OP03	Indication of total hours of operation = stand-by-time including runtime of motor/ running belt (h)	DISTANCE and ELEVATION show: operation hours HEART RATE reports: h
OP04	Indication of total hours of runtime of motor/running belt (h)	DISTANCE and ELEVATION report: operation hours HEART RATE shows: h
OP05	Indication of firmware version and date	SPEED reports “OP05” TIME reports “typE” INDEX indicates device type, e.g. “1.4” DISTANCE indicates: „MCU 5“ ELEVATION reports version, e.g. “1.01.1” HEART RATE reports default type, e.g. 1.3
OP06	Adjustment of actual date and the real time clock	TIME shows: rtc for Real Time Clock ELEVATION reports flashing: date / time, year, month, date, hours, minutes, seconds
OP07	Acoustic heart rate signal	This function is normally used to control the regularity of the heart rate or to find reasons for transmitting problems DISTANCE indicates: OFF or ON OFF: no acoustic heart-rate-signal ON: acoustic heart rate signal for every beat
OP08	Stop time / deceleration time after STOP key in relation to the max. speed	DISTANCE indicates: stop time in sec. ELEVATION indicates: sec for seconds Adjustable from 2.... 30 seconds

OP09	Start speed (Manual mode or cardio mode) for feedback after START key has been pressed. This value can be reduced to 0.0 km/h for advanced users.	SPEED indicates: start speed in km/h ⊙ max blinking ⊙ set unit is blinking Adjustable from 0.0 km/h ... 5.0 km/h
OP11	Scaling of the profiles in profile mode (not for test mode)	DISTANCE shows: scaling possibilities 0: no scaling (standard) 1: Scaling 1...6, which is shown in the profile mode at the display INDEX, refers to all parameters (speed, elevation, time) 2: Scaling 1...6 refers to each parameter (speed, elevation, time) individually
OP12	Unit for display of speed	SPEED indicates: unit for speed ... without decimal place: 3 = m/min ... with one decimal place: 0 = km/h 1 = m/s 2 = mph 23 = m/min ... with two decimal places: 20 = km/h 21 = m/s 22 = mph ⊙ km/h, m/s, mph or m/min is blinking
OP13	Unit for display of distance	DISTANCE indicates: unit for distance 0 = km 1 = miles 2 = m ⊙ m, km, or miles is blinking
OP14	Unit for angle of elevation	ELEVATION PROGRAM indicates: Unit for elevation 0 = % (per cent) 1 = ° (degree) ⊙ % or ° blinking
OP15	Subject's body weight (default value)	DISTANCE indicates: 10 ... 250 (estimated weight) ⊙ weight blinking The personal body weight is necessary for a more correct calculation (estimation) of the power and energy consumption.
OP16	Request for body weight before manual or automatic start	0 = OFF. Request for body weight before starting a program is not required. Calculation of energy consumption and power is based on the body weight entered in option no 15. 1 = ON. Input of body weight before starting a program is required. Calculation of energy consumption and power is based on the entered body weight.
OP17	Unit for energy consumption	JOUL = kJoule is the unit for energy consumption CALO = kcal is the unit for energy consumption
OP18	Maximum speed in cardio mode (default value) (this option is only available for treadmill-ergometers, not for ladder-ergometers)	SPEED reports: 0.0 ... max for the default value for maximum speed in the cardio mode. ⊙ adjusted unit is blinking, ⊙ max. is blinking The value of max. speed in cardio mode can be changed online by pressing + ▶ - ◀

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OP19	Setting of sender for POLAR W.I.N.D. system	0000 0000 = all senders are accepted (can also be set with UP and DOWN) xxxx xxxx = only specific sender with special ID is accepted, must be set with [+] and [-] 9999 9999 = next sender will be accepted, saved and filtered (can also be set with UP and DOWN) (further settings in user OP23 and administrator OP16 are necessary)
OP20	RS232 interface protocol: COM 1 Various ECG and ergospirometry systems support the h/p/cosmos coscom protocol. Individual adaptation of protocol on request. For further information about the h/p/cosmos coscom protocol see www.coscom.org We recommend using the h/p/cosmos coscom v3 protocol as it provides a high standard of safety and functionality and is in compliance with norm EN 62304. All other interface protocols (other than coscom v3) are not validated by h/p/cosmos and not released by h/p/cosmos based on EN 62304 and EN 14971 and must not be used for new installations and configurations of medical devices and medical applications from 21.03.2010. h/p/cosmos para control® and h/p/cosmos para graphics® exclusively work with the h/p/cosmos coscom protocol.	DISTANCE indicates flashing: number of the RS232 interface protocol ELEVATION PROGRAM and HEART RATE SEX AGE WEIGHT reports: OFF = RS232 not active / no protocol / interface deactivated 1 = h/p/cosmos coscom v1, v2, v3 with Baudrate 9600 bps (standard setting COM 1 and COM 2) 2 = JAEGER OXYCON (up to 1995); if available use: h/p/cosmos coscom (= 1). Not to be used after 21.03.2010! 3 = printer protocol (serial printer or converter required) 4 = free 5 = free 6 = free 7 = TM treadmill emulation in km/h if available use: h/p/cosmos coscom (= 1) 8 = TM treadmill emulation in miles per hour if available use: h/p/cosmos coscom (= 1) 9 = free 10 = Loop Back Test (special test plug required, available at h/p/cosmos) 11 = SunTech Tango blood pressure monitor (signal tunnel/loop only) 12 = Remote Control Hardware Terminal MCU 4 (special hardware required) 13 = free 14 = free 17 = free 18 = free 20 = h/p/cosmos coscom v3 with baud rate 115200 bps For advanced h/p/cosmos coscom v3 connections with baud rate 115200, please select OP20=20. Please note that the connected devices/software must be approved for h/p/cosmos coscom v3 with baud rate 115200 (for example h/p/cosmos para control® 4.1).
OP21	RS232 interface protocol: COM 2	See descriptions above

OP23	RS232 interface protocol COM 4	DISTANCE indicates flashing: number of the RS232 interface protocol ELEVATION and HEART RATE reports: OFF = RS232 not active / no protocol / interface deactivated 18 = Chip-card reader PROXOMED (special hardware required) 20 = h/p/cosmos coscom v3 / Baudrate 115200 bps 22 = POLAR W:I:N:D: - System (more adjustments in user option OP19 und administrator option OP16) 23 = Chip-card reader ProMedPlus (special hardware required)#
OP27	Minimum acceleration and deceleration level The selected minimum level is valid for all acceleration and deceleration processes in all modes and profiles.	DISTANCE blinking, reports the min. acceleration / deceleration for all modes and profiles (standard: level 1) Level of settings: 1 ... 5 but not higher than the value in option 28. Due to safety reasons, the acceleration / deceleration levels 5, 6 and 7 cannot be selected. Note: The selected acceleration and deceleration level is NOT valid for control and operation via RS232-interface. In this case the acceleration and deceleration level is set in option no. 29 resp. set in the corresponding command of the h/p/cosmos coscom protocol.
OP28	Maximum acceleration and deceleration level The selected maximum level is valid for all acceleration and deceleration processes in all modes and profiles	DISTANCE blinking, reports the max. acceleration / deceleration for all modes and profiles (standard: level 4) Note: Due to safety reasons, the acceleration / deceleration levels 5, 6 and 7 can only be selected if the safety of the subject is provided for by the use of the fall prevention (e. g. by the safety arch). The maximum acceleration and deceleration level is NOT valid for control and operation via V24/RS232 interface. In this case the acceleration and deceleration level is set in option no. 29 resp. set in the corresponding command of the h/p/cosmos coscom protocol.
OP29	Standard acceleration and deceleration level for RS 232 interface	The selected acceleration and deceleration level is valid for control and operation via RS232 interface. This option is very helpful if the peripheral equipment (e.g. ECG, ergospirometry, PC) does not offer a menu for acceleration and deceleration levels. DISTANCE blinking, reports: 1 ... 5, (standard: 1) for the acceleration and deceleration level for all speed commands via RS 232. The maximum adjustable value depends on the setting of option 28. Note: If the peripheral equipment sends an acceleration and deceleration command via the h/p/cosmos coscom protocol, the selected level in option number 29 is not valid for these speed commands.
OP40	Locking and unlocking of the treadmill	OFF = After switching on, the treadmill is completely locked / not accessible. To unlock the treadmill, press the buttons +, - and START simultaneously. While locked the display shows "no ACCESS" ON = treadmill is unlocked / accessible (standard)
OP41	Locking and unlocking the manual mode	OFF = manual mode is locked / not accessible ON = manual mode is unlocked / accessible (standard)
OP42	Locking and unlocking the profile mode	OFF = profile mode is locked / not accessible 1 ... 6 = profile mode is unlocked / accessible up to the selected profile number standard: 6 Example: selected profile number = 3: The profiles 1-3 can be selected, the profiles 4 – 6 cannot be selected
OP43	Locking and unlocking the cardio mode	OFF = cardio mode is locked / not accessible ON = cardio mode is unlocked (standard)

OP44	Locking and unlocking the test mode	OFF = test mode is locked / not accessible 1 ... 94 = test mode is unlocked / accessible up to the selected test profile number standard: 24 selected test number = 5: The test profiles 1-5 can be selected, the test profiles 6 – 94 cannot be selected
OP45	Report mode display “Index“	0 = Display alternates (default) 1 = Display permanently in MET 2 = Display permanently in KJ 3 = Display permanently in Watt After total switch off the default value 0 will be valid again.
OP46	Report mode display “Elevation“ in profile mode and test mode	0 = Display alternates (default) 1 = Display permanently in % or degree (°), depending on OP14 2 = Display permanently in “Step“ After total switch off the default value 0 will be valid again.
OP47	Sustain values in display resp. automatic “Reset“	OFF = Display values are deleted after pressing START again or automatically after 2 minutes after having pressed STOP (Default) ON = Display values will be continued (added) after pressing START again and will not be automatically deleted by pressing STOP. Display values can only be deleted by pressing the STOP key twice (time, distance, energy).
OP48	Countdown of program step	OFF = The time display counts up each program step ON = The time display counts down each program step
OP52	Output interval for printer protocol	By entering a value between 0 and 100, the output interval is set in seconds for a printer directly connected to the treadmill. Standard: 60 (= printout of all values once a minute). The value 0 disables printing of single values, but not printing of headers and end results (UKK).
OP53	Language settings for printer protocol	Select the language for printouts on a printer directly connected to the treadmill. One of six languages can be chosen. Both, the protocol printout and the test result and training recommendation of the UKK 2 km walking test are printed in the selected language. EnGL = English (standard) SPAn = Spanish GErM = German POrt = Portuguese FrEn = French HUnG = Hungarian For correct printout, the connected printer must be compatible with PCL printer language. For special characters the ISO 8859-1 (Latin-1) font is used.

5.10.1 Standard settings for the user options

Option	Character / Function of option	Default setting	Adjustable range
OP 01	Reset (set back) of error messages.		
OP 02	Total distance (km)	Report only	0 ... 4.294.976 km
OP 03	Total hours of operation stand-by incl. runtime (h)	Report only	0 ... 1.193.046 h
OP 04	Total hours of operation runtime only (h)	Report only	0 ... 1.193.046 h
OP 05	Firmware version	Report only	x.xx.x
OP 06	Adjustment of the real time clock	current date/time	currently ... 31.12.2092
OP 07	Acoustic heart rate signal	OFF	OFF or ON
OP 08	Stopping / deceleration time	5 seconds	2 ... 30 seconds
OP 09	Starting speed (modus manual and cardio)	0.5 km/h	0.0 km/h ... 5.0 km/h
OP 11	Scaling of profile mode	0	0. 1 or 2
OP 12	Unit for display of speed – one decimal place resp. none for 3 = m/min	0 = km/h	0 = km/h 1 = m/s 2 = mph 3 = m/min
	Unit for display of speed – two decimal places resp. none for 3 = m/min		20 = km/h 21 = m/s 22 = mph 23 = m/min
OP 13	Unit for display of distance	2: m	0: km;1: miles; 2: m
OP 14	Unit for angle of elevation	0: % (per cent)	0 = % / 1 = ° (Grad)
OP 15	Subject's Body Weight	65 kg	10 ... 250 kg
OP 16	Bodyweight request before manual/automatic start	OFF (no request)	OFF / ON
OP 17	Unit of energy consumption	JOUL = kJoule	JOUL = kJoule CALO = kcal
OP 18	Maximum speed (default) in cardio mode	6.0 km/h	0.0 ... max. speed
OP19	Setting of Polar W:I:N:D system	0000 0000	xxxx xxxx
OP 20	RS 232 interface protocol: COM 1	1 = h/p/cosmos coscom	1 ... 20
OP 21	RS 232 interface protocol: COM 2	1 = h/p/cosmos coscom	1 ... 18
OP 23	RS 232 interface protocol: COM 4	20 = h/p/cosmos coscom v3	OFF,. 18,. 20, 22
OP 27	Minimum acceleration and deceleration level	1	1 ... 5
OP 28	Maximum acceleration and deceleration level	4	1 ... 7
OP 29	Acceleration and deceleration level for remote control via RS232 interface	1	1 ... 5
OP 40	Locking and unlocking the treadmill	ON (unlocked)	OFF = locked ON = unlocked
OP 41	Locking and unlocking the manual mode	ON (unlocked)	OFF = locked ON = unlocked
OP 42	Locking and unlocking the profile mode	6 (unlocked up to profile 6)	0 ... 6
OP 43	Locking and unlocking the cardio mode	ON (unlocked)	OFF = locked ON = unlocked
OP 44	Locking and unlocking the test mode	28 (unlocked up to test 28)	0 ... 94
OP 45	Report mode display „index“	0	0 … 3
OP 46	Report mode display „elevation“	0	0 … 2
OP47	Sustain values in display resp. automatic „Reset“	OFF	OFF = RESET automat. ON= RESET 2xSTOP
OP48	Countdown of program-step	OFF	OFF = count-up ON = countdown
OP 52	Output interval for printer protocol	60 (seconds)	0 = no single values, 1 ... 100
OP 53	Language settings for printer protocol	English	English, German, French, Spanish Portuguese, Hungarian

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6 Operating manual: running machines for sports and fitness CE

The following models are intended for sports and fitness training:

h/p/cosmos stratos® lt	h/p/cosmos stratos®
h/p/cosmos mercury® lt	h/p/cosmos mercury®
h/p/cosmos stellar® lt	h/p/cosmos stellar®
h/p/cosmos quasar® lt	h/p/cosmos quasar®

Application

The running machines designed for use in sports and fitness are not qualified for medical application.

- It is not allowed to utilize sports grade treadmills for medical application.
- It is not allowed to connect sports treadmills to medical devices such as ECG-systems.

Operation

The operating instructions for medical running machines can also be used for fitness (chapter 5 entitled “Operation”). However, sports and fitness treadmills must never be used for medical applications.

Some operation modes may be locked.

Safety notes, warnings, precautions

All safety notes, warnings and precautions of the medical running machines have to be considered.
(Chapters 4 and 7.1)”.

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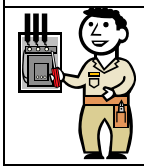
7 Service manual

Some simple maintenance and monitoring (no repair work!), as described, can easily be done or even have to be done by yourself. All kind of installation and repair work as well as most maintenance work is to be carried out only by trained and authorized technicians who have been certified by h/p/cosmos. The following symbols will indicate which work can be done by the customer and which work has to be done by authorized technicians:

	The customer / user should perform this maintenance and monitoring work. Some safety checks or monitoring (for examples of harnesses and ropes, running belt condition and position, etc.) have to be performed on a daily basis. For this reason it is not practical to contract certified technicians for such tasks. However, where it is practical, all maintenance and monitoring work marked with this symbol can also be performed by certified technicians.
	All installation, maintenance, repairs and monitoring work indicated with this symbol must only be performed by trained, authorized technicians who have been certified by h/p/cosmos. Customers/users must not perform these kinds of tasks.

We recommend calling our competent service team or entering into a maintenance contract for a routine service at an interval of 6 or 12 months for standard machines and standard applications. A form for registration of your institution and device is included in the delivery. In order to be able to supply you with the latest technical information and service, it is important for you to fill out the form. Therefore please fill out the form for registration immediately and send it back.

7.1 Safety notes, warnings, precautions

7.1.1 Room conditions

- The bearing capacity of the floor and the height in the building has to be considered before installation.
- Install the device on a sturdy floor and take an adequate precaution to prevent the device from turning over. If the floor is not strong enough or the installation site is not adequate, this may result in injury from the device falling or tipping over.
- Keep a safety zone of at least 2 m in length and the treadmills width behind the running machine and 1 x 1 m in front of the running machine. In case of reverse belt rotation, the frontal safety zone should be same size as the rear. See chapter 5.1 entitled “Operation, General”.
- h/p/cosmos devices must not be used outdoor and/or in environmental conditions other than those specified in the chapter entitled „technical data“ and “Environmental requirements“, (e.g. outdoor, in wet and humid areas or a place where it is likely to be splashed by water or rain water, swimming pools, saunas, environmental chambers, high-pressure-, low-pressure, altitude- and oxygen-chambers, etc.). Deterioration of the insulation, current leakage or electric shock may result.
- The installation room has to meet the requirements of DIN and VDE installation directives.
- Never install the device in a flammable or volatile location. This may cause explosion or fire.
- Never install the device where acid or corrosive gases are present as current leakage or electric shock may result due to corrosion.
- For high performance applications a 3-phase powered treadmill and 3-phase power supply is recommended.

7.1.2 Transport and Installation

- The manufacturer does not assume liability for any damage, complaints or missing parts which are not reported immediately upon delivery on the packing list/delivery note.
- In order to ensure proper installation and safety, the manufacturer, an authorised service crew or an authorised dealer must always transport and install the devices.
- Failure to comply with the conditions listed in this operation and service manual and listed in the operation and service manuals of other respective devices which may be used in connection with this device, failure of performing recommended maintenance and safety inspection intervals, unauthorized maintenance or amendments of the design and/or performance and/or specifications and/or labelling of the devices shall absolve h/p/cosmos sports & medical gmbh from any responsibility for the safety, reliability and performance of this equipment.
- Always ground (earth) the device to prevent electric shock. If the power supply outlet is not grounded, it will be necessary to install a ground by qualified engineers.
- Never ground the device through a gas pipe, water main, telephone line or lightning rod. Such grounding may cause electric shock in the case of an incomplete circuit.
- Connect the device to a power source as indicated on the name plate (rating label) attached to the unit. Use of any other voltage or frequency other than that on the name plate may cause fire or electric shock or may cause other damages.
- Plug the running machines directly into the wall socket with a protection system. Each running machine should be connected to a separate circuit. The socket is to be marked with name and serial number of the running machine. The use of extension cables or a multiple plug socket is prohibited.
- An overload or voltage drop (even temporary) of more than 20 % of the mains voltage might cause malfunctions and/or defects and might totally switch-off the running machine. In the event of such high voltage drops or total power failure, the running machine switches off and the running belt stops. To start again, switch on the running machine at the main „ON“ switch and then press START on the keyboard.
- When connecting treadmills to the multiple safety socket, there are no performance limitations to expect at low-performance applications (walking, slow running). For high-performance applications (fast running, sprints, etc.,) the use of the multiple safety socket can result in performance limitations.
- For treadmills used in the medical field:
  - All devices are to be connected via a potential compensation cable in „star connection“ with the potential compensation bar.
  - First connect the potential compensation (potential equalization) with the corresponding plug pin (next to the main switch on the front) and then connect the mains plug.
  - During electric safety measurements and tests (leakage currents, etc.) the potential equalization cable has to be disconnected temporarily.
  - Due to the very high electrical load of treadmills, do not connect more than one treadmill or other electrical device with high load to the multiple safety socket. Use a dedicated line only.
- After adjusting the running belt, the allen key must be pulled out of the screw immediately after usage due to risk of injury!
- There are dangerous capture areas/gaps at the elevation system as well as at the rear end and the sides of the running belt. At reverse belt rotation there is also danger at the motor hood and front area.
- It should be ensured that all cables (power connection, interface, potential equalization, etc.) and accessories are installed properly and safely and that nobody can stumble or fall over the cables and/or accessories.
- The connection of the gas pressure container has to be checked for MOT-admissibility (TÜV).
- Absorption, cleaning and disinfecting chemicals are to be kept in the appropriate reservoirs.
- All lubrication material and all other parts should be kept away from children and animals.

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- Do not modify the running machines and do not connect to other equipment which is not explicitly declared compatible by all involved manufacturers.
- Only connect accessories, software and host equipment if it is confirmed as compatible by all manufacturers.
- It is not allowed to connect sports treadmills to medical devices such as ECG-systems.
- Connecting a running machine to a medical device results in a medical system. Only trained staff is authorized to perform this connection. Always use IEC 60601-1 approved potential isolation components. This medical system is to be connected via a potential balance cable with the provided connector bolt and bearing within the designated room.
- The power consumption of the devices which are connected to the IEC sockets of the external UserTerminal (models venus and saturn) must be in total lower than 300 W.
- Do not insert metal objects such as a pin or a wire into any vent, gap or any outlet on the device. This may cause electric shock or injury by accidental contact with moving parts.
- Do not touch any electrical parts (such as power supply plug) or operate switches with a wet hand. This may cause electric shock.
- Never put containers with liquid on the device as this may cause electric shock or short circuit when the liquid is spilled.
- Never bind, process, or step on the power supply cord, or never damage or break the power supply plug. A broken supply cord or plug may cause fire or electric shock.
- Do not use the supply cord if its plug is loose. Such supply cord may cause fire or electric shock.
- When removing the plug from the power supply outlet, grip the power supply plug, not the cord. Pulling the cord may result in electric shock or fire by short circuit.
- Disconnect the power supply plug before moving the device. Take care not to damage the power cord. A damaged cord may cause electric shock or fire.
- Disconnect the power plug when the unit is not used for long periods. Keeping the connection may cause electric shock, current leakage, or fire due to the deterioration of insulation.
- If the device is to be stored unused in an unsupervised area for an extended period, ensure that children do not have access.
- Do not put packing plastic bags, plastic foils or other materials within reach of children as suffocation may result.

7.1.3 Maintenance and safety inspections

- Maintenance and repair of the devices (also opening of the device) have to be performed by service engineers authorized and certified by h/p/cosmos, preferably within the scope of a maintenance contract. The installation by unqualified personnel may cause electric shock or fire or other damages or electric shock or injury due to a malfunction. Never disassemble, repair, or modify the device yourself.
- In case of any detected and/or assumed malfunction and/or defects and/or unreadable safety labels, the device is to be disengaged immediately. The device is to be marked and secured against operation and the supplier and authorized service personnel has to be informed in writing immediately.
- Before intervention in the device, switch the running machine off and pull the mains plug from the power supply.
- During all maintenance work and safety tests, ensure that no third parties are directly or indirectly in contact with the device under test and/or the technician performing the test. Keep a safety zone of 2 m radius clear.
- Due to environmental influences, interior climate and type of application (for example frequent short-run operation or infrequent long-run operation, etc.), the required automatic oil setting of the treadmill can deviate extensively from the factory setting.
- In case the required lubrication, quantity and quality is not assured due to lack of inspections by the user and/or lack of maintenance by authorized h/p/cosmos service technicians, early damage to the running belt and running surface can occur and warranty will expire.
- In case of any maintenance work on the treadmill, ties have to be removed. The tie might be pulled in and the person wearing will be strangled

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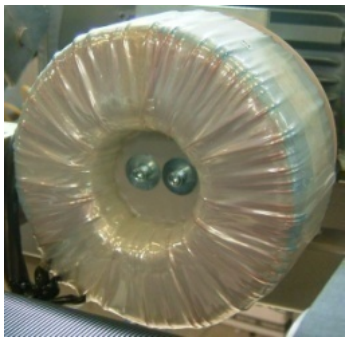
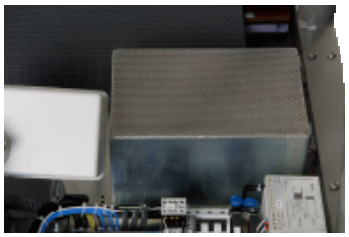
7.2 Electrical safety features



Potential isolation transformer

Potential equalization connector

Shielded motor cable

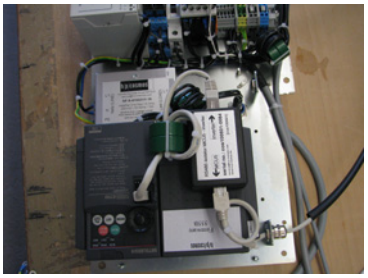


Frequency inverter metal housing

(for shielding)

Opto coupler board [cos13057]

(only with analogue inverter control)



Opto coupler board [cos100601]

(only with digital RS485 inverter control)

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7.3 Medical device software classification

Software safety classification according to IEC/EN 62304 medical device software; software lifecycle processes:

The manufacturer has to assign a software safety class to any software, according to possible dangers the software might impose to the patient, the user or third parties.

Based on degree of severity, the software safety classes are assigned as follows:

Class A: No injury or damage to health possible
Class B: No SERIOS INJURY possible
Class C: DEATH or SERIOS INJURY possible

Without risk reducing measurements and risk reducing design, a software for treadmills and interface protocols would have to be classified as class C, i.e. most dangerous including the risk of death because undesired and uncontrolled acceleration of the running belt can always cause the subject to fall off the belt with the possible result of a broken neck or other serious injuries. Due to a possible technical malfunction of a measurement (e.g. heart rate measurement), which is a theoretical possibility, the patient may be overloaded with the possible risk of death.

It should be mentioned that medical treadmill ergometers and their software use SOUP (software of unknown provenance) components. Thus, the frequency inverter, motor regulation, firmware and parts of the PC software are components of medical treadmill ergometers and the treadmill manufacturer has no access to design, validation and maintenance of these supplier's components. For this reason the worst case malfunction scenario has to be taken into account.

h/p/cosmos classifies the internal firmware and software components as class B due to a number of risk reducing design features and measurements.

Healthy people who practice sports are usually able to activate the emergency stop button of the treadmill and in this way switch off the treadmill quickly in case of emergency caused by malfunction. Thus, the emergency switch off has to work completely without software and has to interrupt the power supply of the treadmill. For patients and medical users fast reactions of the patient cannot be ensured, since a very light acceleration may also cause the subject to fall off.

To control risk for patients and persons with disabilities, a fall prevention system (e.g. safety arch with chest belt, harness and fall stop rope), which catches the patient in the event of a fall, is to be used for applications with a higher risk of falling (e.g. hip replacement patients, neurologic patients, cardiac patients, maximum load tests, etc.) or when falling could result in serious injuries, for example when the patient is connected to invasive probes.

For the acceleration of the drive motor and running belt safety delay, design measures have been incorporated, which prevent extreme fast acceleration in case of malfunction.

Warning labels based on EN 957-6 regarding possible malfunction and inaccuracy of heart rate sensors and displays are placed on the treadmill and in the operation manual.

Furthermore, the patient on the medical treadmill has to be observed permanently; the medical staff has to be within 1.5 m radius around the patient.

Risk analysis and risk control are included in risk management according to EN 14971.

Firmware development and documentation for internal treadmill-related firmware is applied according to EN 62304 medical device software; software lifecycle processes.

7.4 Installation & commissioning

7.4.1 Unpacking and packaging

When receiving the machine in a crate or unpacked, make sure the machine, the accessories and/or the packaging is not damaged. If you discover any damage and/or missing parts make a note on the packing-list / delivery note of the carrier. Inform h/p/cosmos and your dealer immediately in writing about any damage and/or missing parts.

The manufacturer does not assume liability for any damage, complaints or missing parts which are not reported immediately upon delivery on the packing list/delivery note.

Before unpacking the machine and accessories, read the instructions on the crate. Make sure that the machine, power connection cable or any optional equipment will not be damaged during unpacking. Pay special attention to small parts, so that you do not dispose of them or any instructions with the packaging. Within Germany, most devices are delivered and assembled by h/p/cosmos directly or by an authorised forwarder. If delivered by h/p/cosmos, the packaging will be removed and recycled.

If the running machine is delivered by a carrier, you can recycle the packaging yourself or send it back to the manufacturer (transportation to be paid by the customer). Often a recyclable transport tool, packaging material or a transport fuse (metal angle with screws) is included in the scope of delivery.

Ask your dealer and the carrier to take the packaging and the recyclable transport tool back to your dealer or to h/p/cosmos at your own costs. In some cases, a credit note can be granted. Special packaging and/or carrier constructions must not be disposed unauthorized.

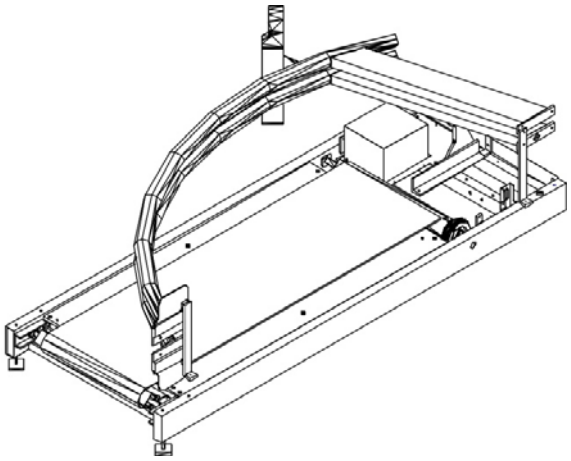
7.4.2 Transport

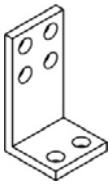
Transport to upper or lower floors and through narrow doorways:

With the standard models (sizes with running surface 150/50 cm, 170/65 cm, 190/65 cm), the left handrail is easily removed (unless it is an adjustable handrail), as there are no cables inside. The handrail at the right can be unscrewed and turned 90° to the left ("lay it on the running belt"). Then the handrail is to be temporarily fixed with a special transport fuse construction (available at h/p/cosmos) in order to avoid damage during transport.

Provided the right handrail is flat and temporarily fixed on the running surface, the whole machine can be turned 90° to the right to an upright position. This reduces the width of the machine so that it can be easily manoeuvred through narrow doors or windows.

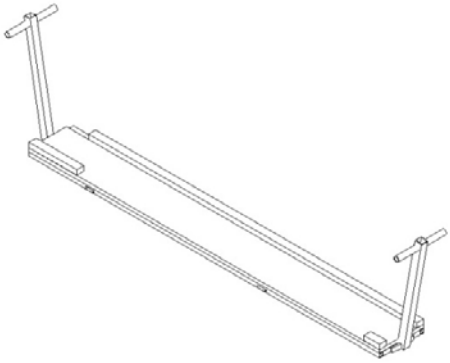
A special transport tool is available to move the machine through aisles. (See below: available on rental basis from h/p/cosmos).

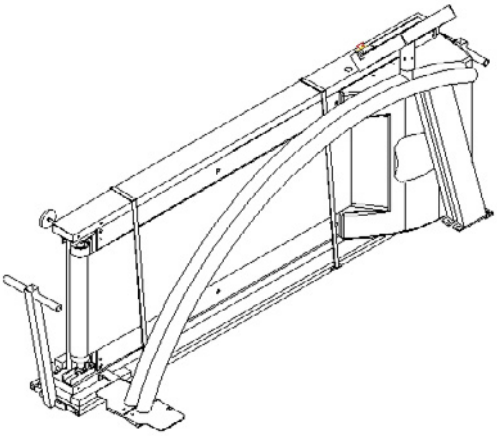




Transport angle construction running surface 150/50 cm [cos10971]
Transport angle construction running surfaces 170 and 190/65 cm [cos10314]
Transport angle construction running surface 200 ... 300/75 ... 125 cm [cos14090]

Transport tool for construction size running surface 150/50 cm [cos10972]
Transport tool for construction size running surfaces 170 and 190/65 cm [cos13794]





Transport with trolleys:

For easy transport, put two normal trolleys under the device (platform approximately 30 cm x 30 cm with 4 manoeuvrable wheels each) to make the device mobile.

Trolley with 4 wheels for max. 300 kg (660 lbs) [cos13016]
Trolley with 4 wheels for max. 500 kg (1100 lbs) [cos13672]

Packaging of oversize running machines:

Transport of oversize running machines:

Large machines are best moved through the window with the help of a special basket and a mobile crane.

Transports of heavy devices must only be carried out by authorised staff in compliance with the safety standards. Otherwise there is serious danger for people and devices.

7.4.3 Storage

Store the devices at a temperature of – 20° ... + 50° C. All devices can be stored without power connection and without operation for a period of 6 – 9 months. After this period, batteries in the device may be discharged. Maintenance and/or a new setup/programming of the device by an authorized h/p/cosmos technician may be necessary

7.4.4 Environmental requirements / room configuration

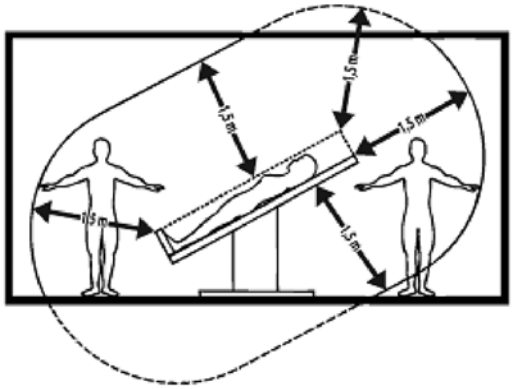
The bearing capacity of floor and ceiling in the building must be higher than the weight of the machine. An authorized body of the operator must certify the bearing capacity for the h/p/cosmos device. For example, the h/p/cosmos saturn 300/100r: dimensions ground frame running machine: L: 3400 mm x B: 1490 mm = 5.066 m² platform. Net static weight of running machine: 1300 kg, static body weight of subject: 200 kg, dynamical weight of subject: 1200 kg (up to 6 times the body weight), total weight load of system at platform: 2500 kg = required dynamic bearing capacity (493.48 kg ~ 500 kg/m²). Note: Usually the bearing capacity data of the building are indicated in the static load, so that static load of the building and static load of the treadmill, including subject should be compared.

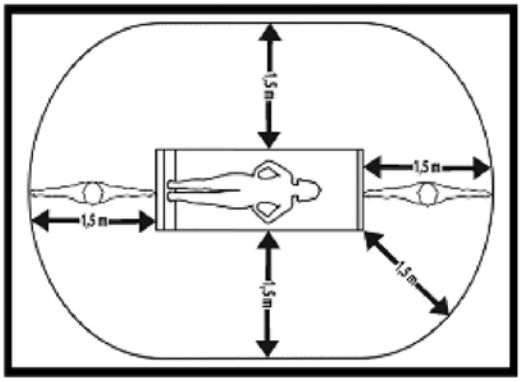
Running machines are not to be used in medically utilized rooms with a danger of explosions or in easily inflammable atmospheres. The devices must not be installed near to e.g. an x-ray device, motors or transformers with high voltage connection, as the electric and magnetic interference can falsify measurements or even render them impossible. High voltage lines must be avoided nearby the device. h/p/cosmos electrical devices with mains connections must neither be used in wet and humid areas (e.g. swimming pools, saunas, etc.) nor in environmental chambers. If not stated otherwise in the delivery information, h/p/cosmos devices are designed for operation in normal climatic surroundings:

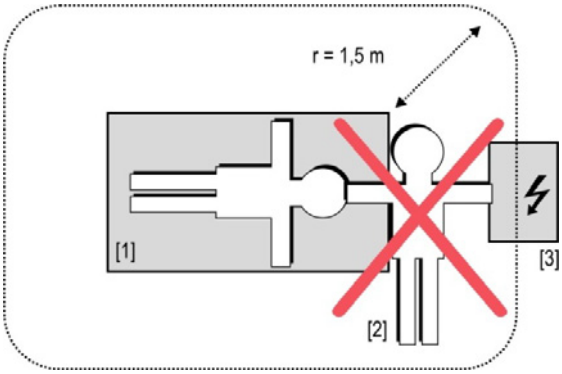
Temperature:	+ 10° ... + 40°C
Relative humidity:	30 ... 70 % (non condensing!)
Air pressure:	700 ... 1060 mbar
Maximum operating altitude:	approx. 10,000 feet (3000 m), without pressurization

The running machine should be protected from high humidity. Vents are not to be covered, as this would hinder the air circulation.

The surroundings of the patient/subject must have a gap of 1.5 m as required by the norm EN 60601-1.







⚠	Electrical equipment [3] and a subject [1] must never be touched by the doctor or trainer [2] at the same time.

Casing and cover:

Parts of non-medical electric devices within the surrounding of the subject, which, after having taken off the coverings etc. without the use of tools for a routine maintenance etc., are in touchable reach, have to operate with a voltage that does not exceed 25 volt alternate voltage and 60 volt direct voltage, which is produced by a separate source as described in IEC 60601-1. According to this example the leakage current would flow from the electric device to the earthened subject via the trainer/doctor.

7.4.5 Mechanical installation

- Keep a safety zone of at least 2 m in length and the treadmills width behind the running machine and 1 x 1 m in front of the running machine. In case of reverse belt rotation, the frontal safety zone should be same size as the rear. See chapter 5.1 entitled “Operation, General”.
- The floor must be very solid, stable and firm. If the floor is bouncing, the treadmill will bounce too which can affect running characteristics and energy consumption data and which can also create noise in stories underneath the floor.
- Put a gymnastic mat (or something similar) in front of and behind the running machine to protect the subject in the event of a fall. Place the device on a rubber mat as large as the device to protect the floor from dust and scratches, to ensure a firm stand and to reduce noise.
- The designated space for the running machine must allow even and horizontal positioning of the device.
- Models with levelling sockets (adjustable "feet") at the rear of the running machine have to be adjusted so that they have a firm stand to avoid noises such as knocking or rattling during the training. Check the weight load pressure on the levelling sockets (weight of the running machine at the rear), by trying to lift the frame off the ground at the rear of the running machine one side after the other. Thus, it can be determined whether the same load is on both sockets.
- The levelling sockets and the front wheels of the elevation system may cause a print in the flooring. Please use h/p/cosmos floor mats to protect sensitive flooring:
  Floor protection mat 150/50 for running machines with deck size 150x50 cm [cos14005]
  Floor protection mat 170/65 for running machines with deck size 170x65 cm [cos14042]
  Floor protection mat 190/65 for running machines with deck size 190x65 cm [cos14043]
  Other sizes available on request.
- For models without levelling sockets: Make sure that the floor is even and horizontal, and the entire base frame rests on the floor.
- For models with a running surface of 200 x 75 cm or larger, ensure that the floor is even and horizontal and that the entire base frame rests on the floor. The device is equipped with levelling sockets, but they should only be used in case of an uneven floor.
- The transportation locks have to be removed after setup on the h/p/cosmos gaitway model with integrated force plate. Drive elevation up to max of 25 %. Loosen the four M8 screws, marked with the silver arrows on the underside of the aluminium force plates, and remove them. Drive elevation down to 0 %. Loosen the lock nuts at the levelling sockets. Now level out the running machine with the help of the Kistler software and then tighten the locknuts again.
- After installation or change of location, check and, if necessary, adjust the running belt (see chapter 8.5 and 8.6 for maintenance instructions), so that it is placed exactly in the middle of the two rollers.
- If the running machine has been installed safely and horizontally, it can be plugged in (see chapter 7.4.6 entitled “Electrical installation“) and taken into operation.
- It is recommended to lubricate the running surface with 30 ml silicone oil before using it for the first time. See separate chapter 8.4 entitled "Lubrication of the running belt / running surface".

7.4.6 Electrical installation

⚠	An overload or voltage drop (even temporary) of more than 20 % of the mains voltage might cause a malfunction and/or defect and might totally switch off the running machine. In the event of such high voltage drops or total power failure, the running machine switches off and the running belt stops. To start again, switch on the running machine at the main "ON" switch and press START at the keyboard.

- h/p/cosmos running machines are to be installed at a voltage power connection with ground wire (earthing,) including leakage-current protection switch (interrupter) and according to VDE 0100 or/and the currently valid regulations and directives. Requirements for special locations, areas and establishments (e.g. medically used areas) must be strictly adhered to. PE connection (protection-earth contact) is stipulated for all running machines. The voltage drop between the beginning of the consumer's installation and the wall socket must not be more than 4 % (DIN VDE 0100-520). It is the consignee's and user's personal responsibility to check the correct function of the mains connection including the outlets. An authorized electrical engineer must check these points for perfect functioning regularly (1 ... 4 years). Inspections of the electrical installations within the building are not incumbent on the supplier h/p/cosmos.
- Read the nameplate of the machine before connecting the machine to the power outlet in order to determine whether the machine was designed for special voltage supply (e.g. 110 V and 25 A). The standard power supply of 230 V / AC, 50/60 Hz is sufficient for most of the running machines.
- The bigger running machines (with a size of running surface 190/65 cm models pulsar 3p and venus / saturn up to 450/300 cm) require a 3 phase AC power supply: 3 x 400 V / 32 A fuse (16 A for models pulsar 3p) and clockwise rotation.

right: CEE power outlet (socket), 5-pin, 16 A [cos11092]

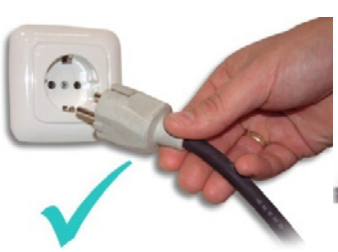
left: CEE power outlet (socket), 5-pin, 32 A [cos11090]

Power supply for h/p/cosmos pulsar 3p	Power supply for h/p/cosmos venus and saturn
400 Volt AC 3~/N/PE f: 50/60 Hz Imax: 16.0 A	400 Volt AC 3~/N/PE f: 50/60 Hz Imax: 32.0 A
3 phase current with clockwise rotation field.	3 phase current with clockwise rotation field.
16 A fuse (C characteristic)	32 A fuse (C characteristic)

The mentioned wire colours are applicable for Germany; different colours may be applicable for other countries.

Voltage values for 3-phase voltage power supply:
from L1 to L2: 400 V, from L1 to L3: 400 V, from L2 to L3: 400 V
from L1 to N: 230 V, from L2 to N: 230 V, from L3 to N: 230 V

- After having switched on a 3-phase machine, an elevation of 0 % is automatically adjusted. If this is not the case, the unit is to be switched off immediately and the two phases of the wall socket changed so that the device is supplied with right-handed polarized power. Otherwise the elevation cannot be set correctly and the power supply of the motor for controlling the elevation is switched off via the limit stop switch on the base frame.
- Use a usual 16 Ampere expulsion fuse with “C” tripping circuit for your house distribution. For running machine models with a construction size of the running surface of 200/75 cm up to 300/125 cm, you will need a 32 Ampere expulsion fuse with “C” tripping circuit. If, however, the expulsion fuses switch off when starting the device, the circuit has to be secured with a blowout fuse or an expulsion fuse with another tripping circuit (e.g.: K–fuse). Read name plate and technical data of the machine just to make sure.
- Please ask your electrical engineer or h/p/cosmos if you have further questions.
- Before installing the running machine, please compare the specifications on the name plate concerning the mains voltage and the mains frequency with your local characteristics. Connect only if identical.
- Check the main lead, the voltage power supply outlet and ground wire protection contacts before plugging in. Damaged leads and couplers and defective or dirty contacts have to be exchanged immediately. Rubber leads can become porous and friable after some years.



- Plug the running machines directly into the wall socket. Each running machine should be connected to a separate circuit. Mark the socket with the name and serial number of the running machine.
- The use of extension cables or multiple plug sockets is not allowed.
- Electrical devices with mains connections must neither be used in wet and humid areas (e.g. swimming pools, saunas, etc.) nor in environmental chambers.

In case the treadmill is operated in connection with any host equipment (for example printer, PC, etc.) make sure a certified medical multiple plug socket with article no. [cos100157] is used as described in chapter 12.19 “Safety multiple socket” on page 172.

name plate of a sports device with 1-phase power supply
example: h/p/cosmos quasar®

name plate of a medical device with 3-phase power supply
example: h/p/cosmos pulsar® 3p

For details please refer to chapter 11 entitled "Technical data”.

7.4.6.1 Electric safety measurements and “First Measured Values“

Immediately upon first installation at the customer’s site an electric safety test and measurement has to be performed for “Protective Earth Resistance“, “Isolation Resistance“ and “Leakage Current“. The values are to be recorded in a special protocol [cos11690xx] and marked as “first measured values“.
Further details are described in chapter “Maintenance / safety inspections”.
One copy of this protocol [cos11690xx] remains with the owner’s manual while the original of the protocol with the “first measured values“ should be sent to the manufacturer h/p/cosmos.
Picture: Example for electric safety testing device based on IEC 60601-1

7.4.6.2 Potential equalization (only for medical treadmills)

The potential equalization cable must be connected to the connector on the device plug and to the potential compensation bar within the medically used room. During installation, connecting or disconnecting the potential equalization, the running machine must not be connected to the power supply. Protection against electric shock has to be provided in the finished product/device.

Standard potential equalization cable (length 5m) with 4 mm² cross-section [cos10223]

- When used in the medical field, all devices within the system have to be connected via a potential compensation cable in “star-connection“ with the potential compensation bar within the designated room.
- First connect the potential compensation (potential equalization) to the corresponding plug pin (next to the main switch on the front) and then connect the mains plug.
- During electric safety measurements and test (leakage currents, etc.), the potential equalization cable is to be disconnected temporarily and re-connected after the electric safety measurements and test.

7.4.6.3 General notes and benefits of potential equalization

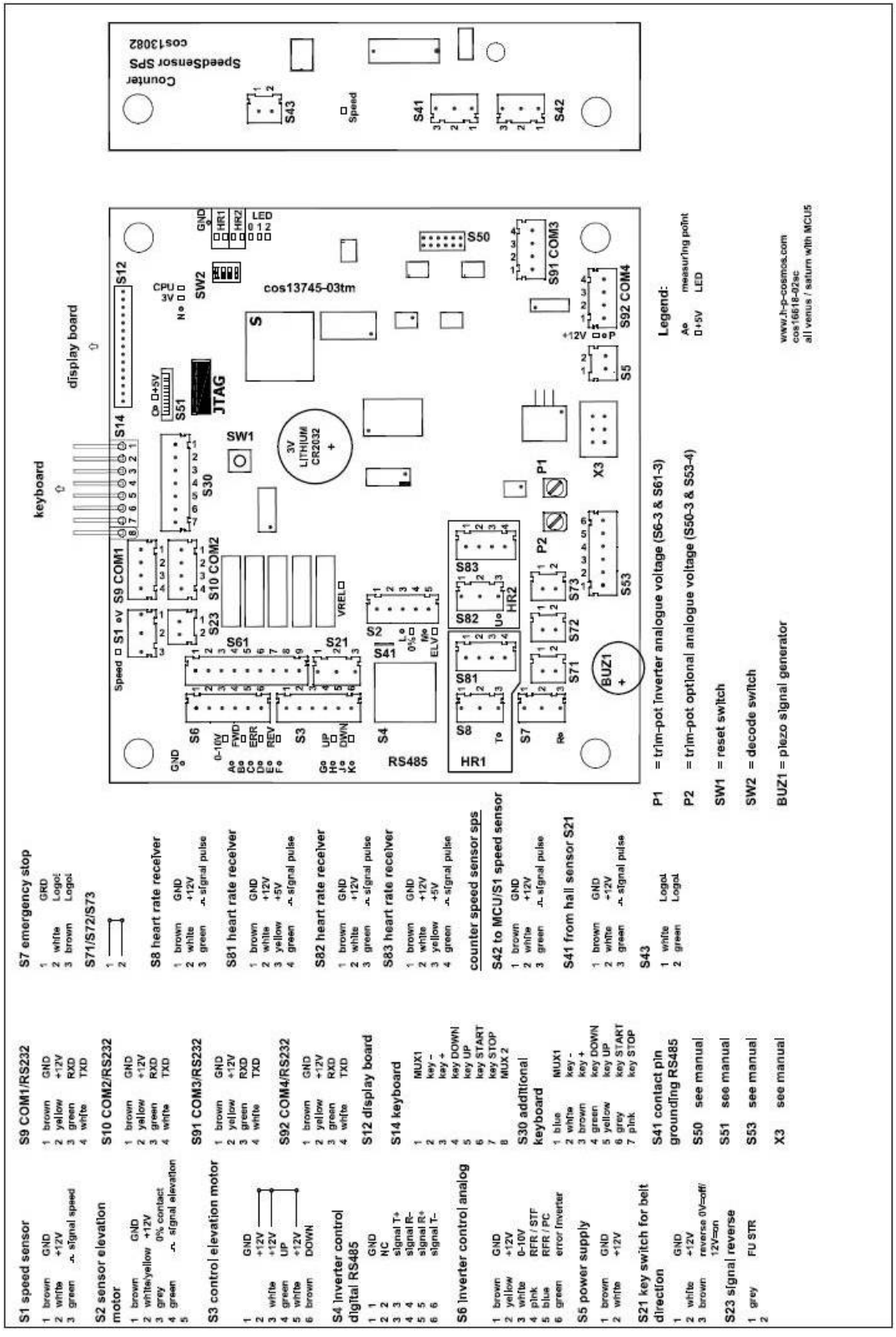
The voltage of a conductor or body to earth is called the "potential" of this conductor or body. The earth is electrically neutral and thus has the potential "zero". The unit of measurement for the potential is volt.
A conductor or body has the potential "zero" (earth potential) if it is conductively connected with the earth.
As a consequence of damage to the insulation, voltages may be transmitted to metal parts which do not belong to the service circuit. This causes the development of potentials between the metal parts which might be dangerous for man. If a man touches two different metal parts at a time - for instance an electrical device and a water pipe - he bridges the existing potential and current flows through his body. The flow of electric current through the body of a human being could be mortal. A remedy for this is a potential equalization to zero potential. Potential equalization therefore can be seen as an additional earthing (in addition to normal earthing included in power cords) and improves the safety standard of medical devices and medical systems.

Potential equalization has the additional benefit of equal voltage potential on all involved metal housings of medical devices of a medical system (for example treadmill, EMG, ECG and metabolic cart). Different voltage potentials on housings could lead to false measurements during medical diagnosis, since the difference of voltage potential of the medical devices within a system would interfere with voltage measurements (ECG, EMG, etc.) of the human body.
Thus, potential equalization is also important for correct and valid measurements.

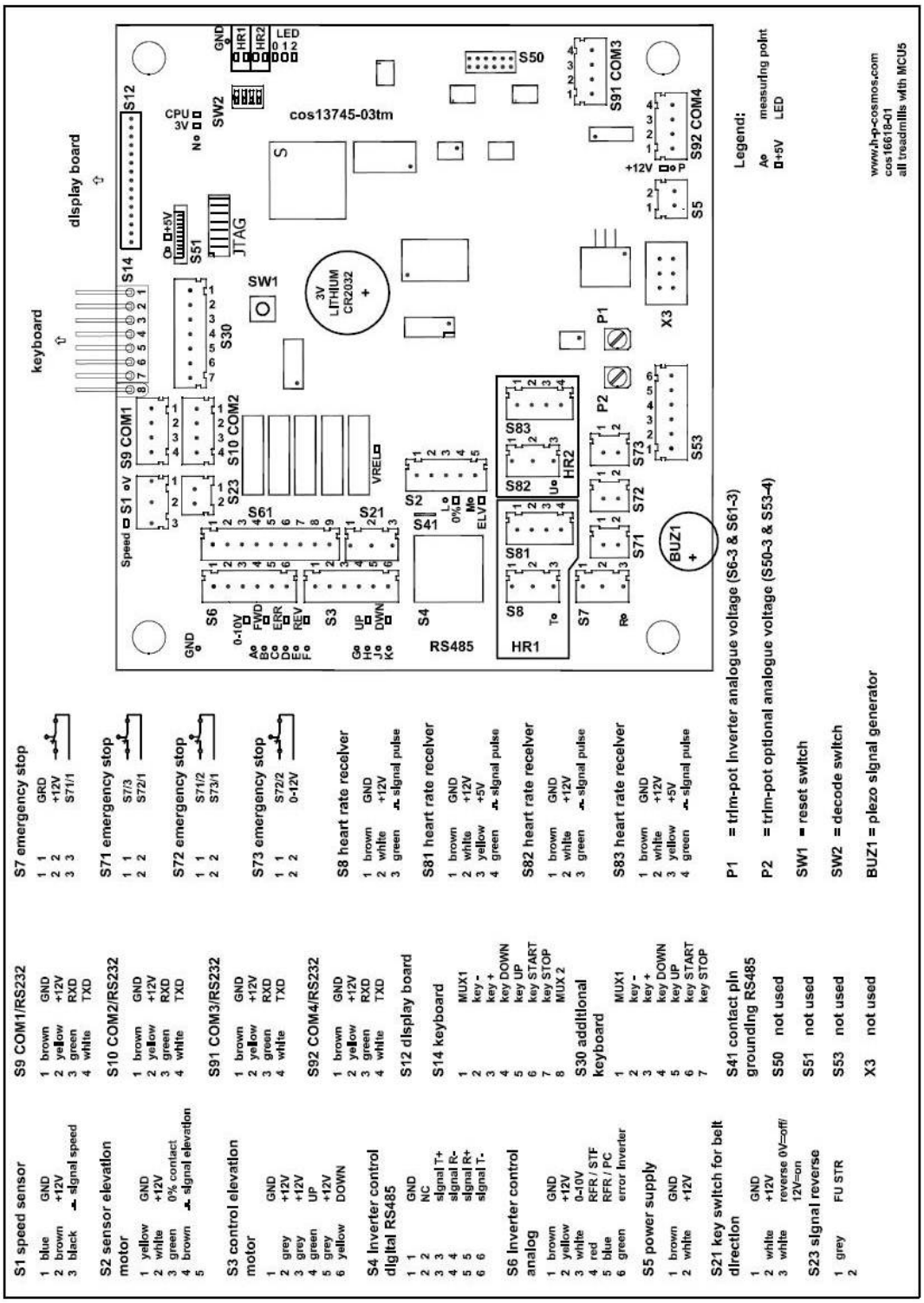
7.4.6.4 Plug assignment at the UserTerminal

If the UserTerminal was disassembled during transport, please connect the cables according to the following illustration:

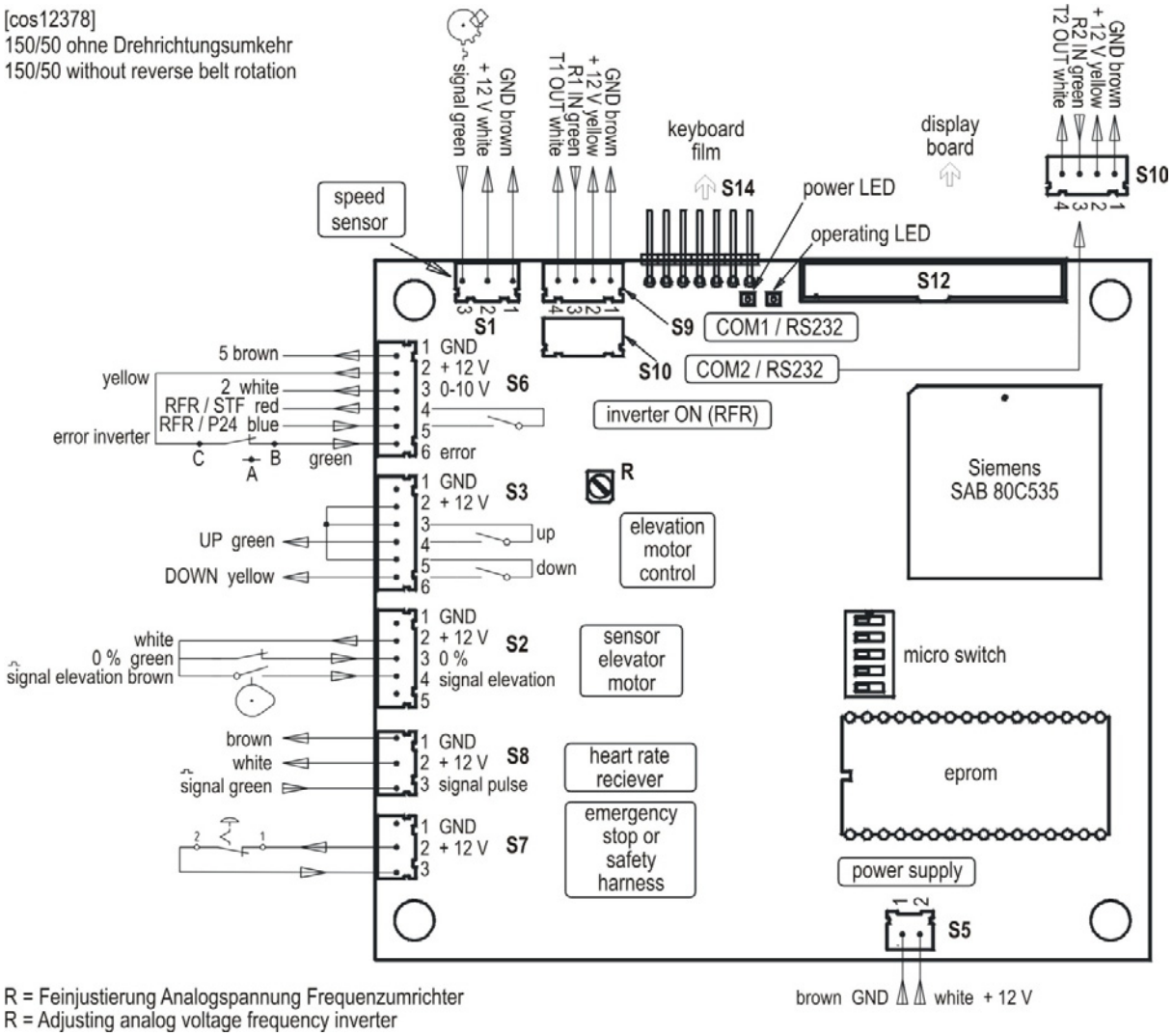
Devices with MCU5 control unit (since manufacturing date 02/2010)



Devices with MCU5 control unit (until manufacturing date 02/2010)

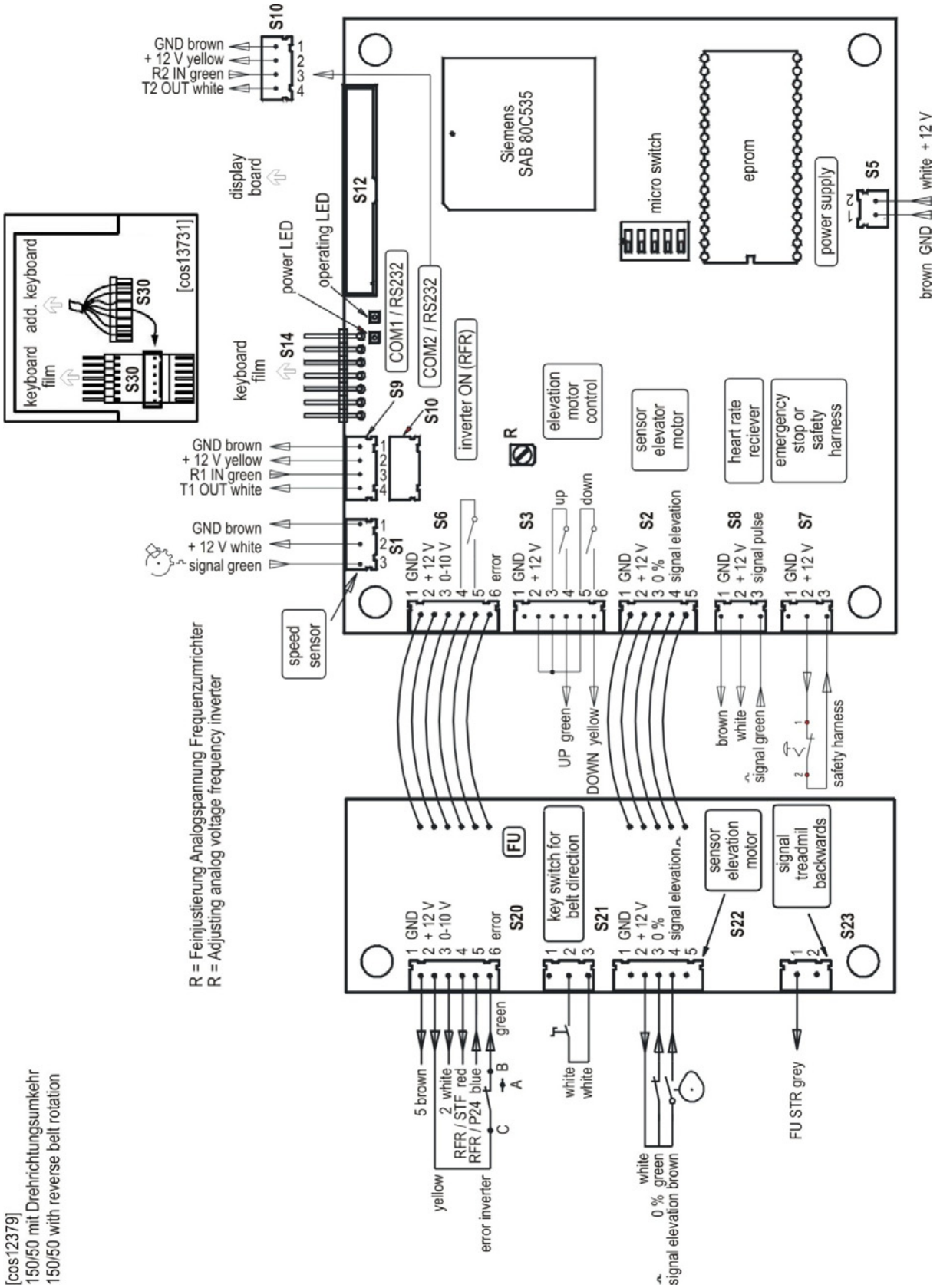


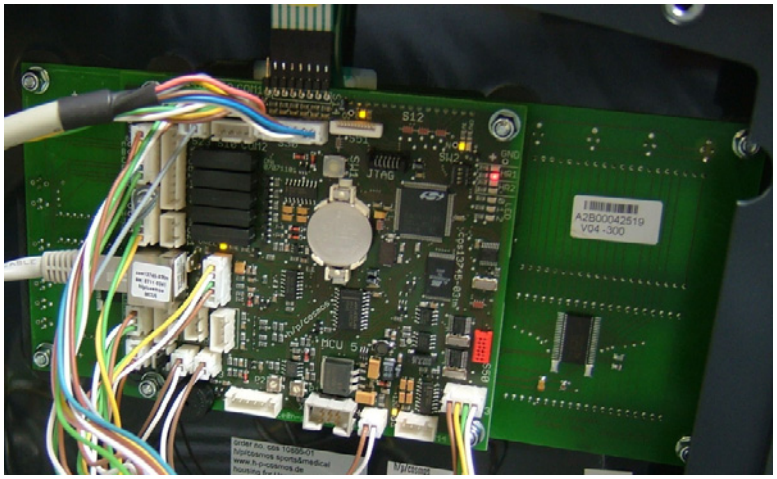
Devices with MCU4 control unit (until manufacturing date 12/2007)



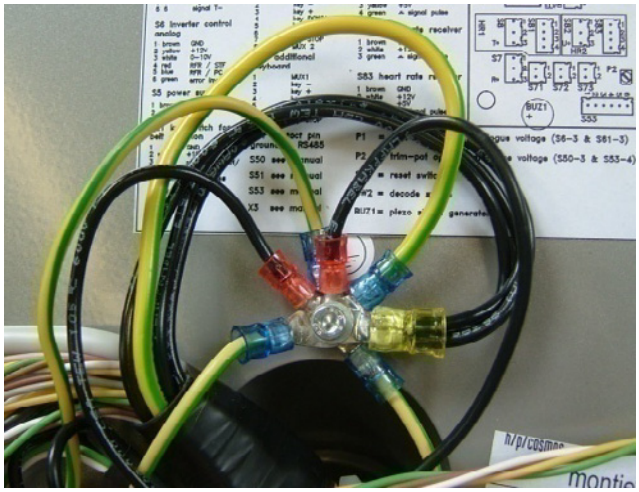
R = Feinjustierung Analogspannung Frequenzumrichter
R = Adjusting analog voltage frequency inverter

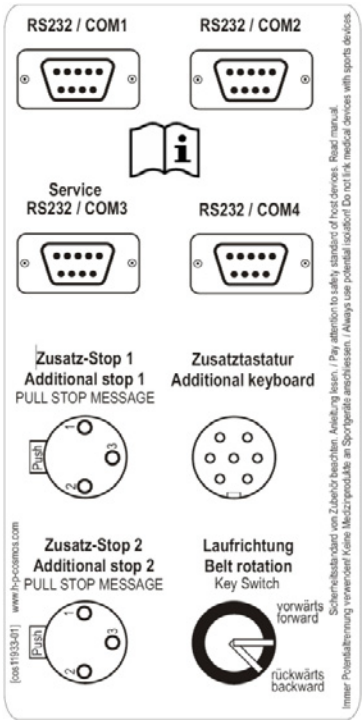
For devices with MCU4 control unit (until manufacturing date 12/2007) and reverse belt rotation





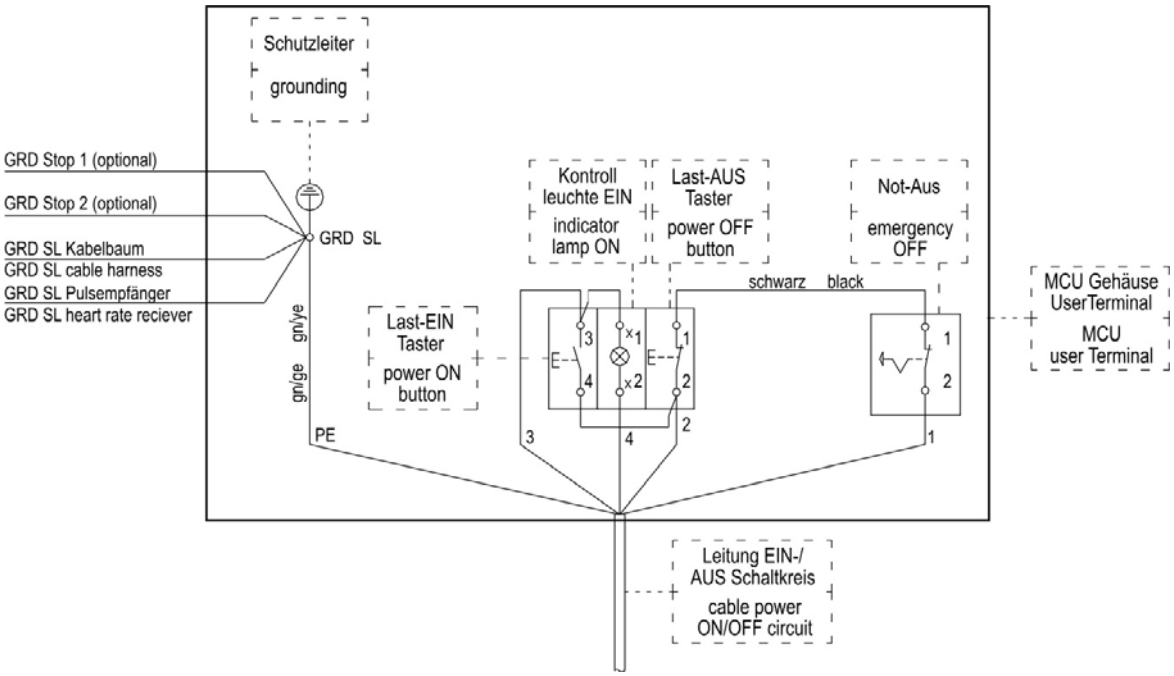
MCU5-control-board and display board inside the UserTerminal





Sticker for plug references at the back plate of the UserTerminal

Sticker for plug references at the External UserTerminal control unit differs.



Cable connection for ON/OFF button and emergency stop in the UserTerminal. GRD = ground (until manufacturing date 12/2007)

7.4.7 Cable connections models 200-300/75-125 (venus / saturn)

cos100710 socket in UserTerminal for inverter, drive and elevation motor

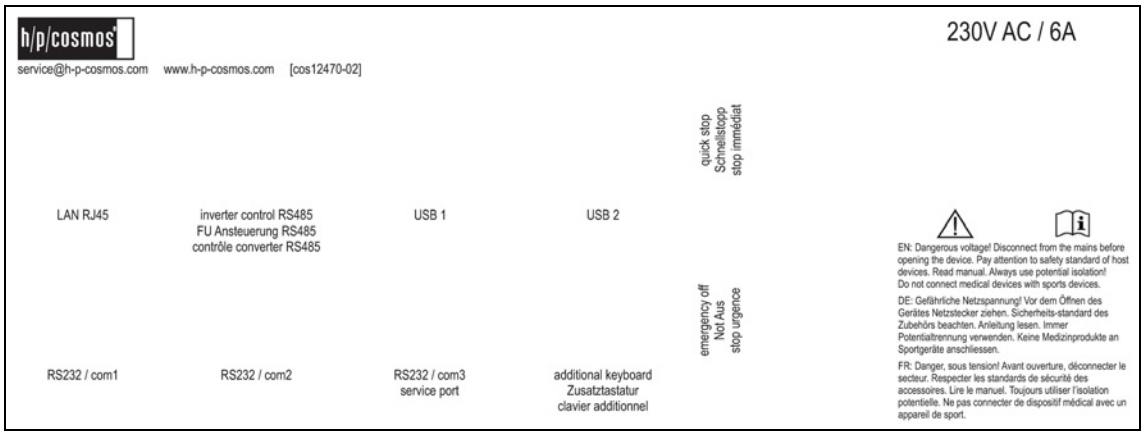
cos100721 plug in running machine

cos100719 socket in UserTerminal

cos100716 plug in running machine

The above listed sockets and plugs have to be connected with the supplied cables and connectors.

cos12470-02 interface terminal on the external UserTerminal


h/p/cosmos
service@h-p-cosmos.com
www.h-p-cosmos.com
[cos12470-02]
230V AC / 6A
quick stop
Schnellstopp
stop immédiat
LAN RJ45
inverter control RS485
FU Ansteuerung RS485
contrôle converter RS485
USB 1
USB 2
emergency off
Not Aus
stop urgence
RS232 / com1
RS232 / com2
RS232 / com3
service port
additional keyboard
Zusatztastatur
clavier additionnel
EN: Dangerous voltage! Disconnect from the mains before opening the device. Pay attention to safety standard of host devices. Read manual. Always use potential isolation! Do not connect medical devices with sports devices.
DE: Gefährliche Netzspannung! Vor dem Öffnen des Gerätes Netzstecker ziehen. Sicherheits-standard des Zubehörs beachten. Anleitung lesen. Immer Potentialtrennung verwenden. Keine Medizinprodukte an Sportgeräte anschliessen.
FR: Danger, sous tension! Avant ouverture, déconnecter le secteur. Respecter les standards de sécurité des accessoires. Lire le manuel. Toujours utiliser l'isolation potentielle. Ne pas connecter de dispositif médical avec un appareil de sport.

EN: Dangerous voltage! Disconnect from the mains before opening the device. Pay attention to safety standard of host devices. Read manual. Always use potential isolation! Do not connect medical devices with sports devices.	DE: Gefährliche Netzspannung! Vor dem Öffnen des Gerätes Netzstecker ziehen. Sicherheits-Standard des Zubehörs beachten. Anleitung lesen. Immer Potentialtrennung verwenden. Keine Medizinprodukte an Sportgeräte anschliessen.	FR: Danger, sous tension! Avant ouverture, déconnecter lesecteur. Respecter les standards de sécurité des accessoires. Lire le manuel. Toujours utiliser l'isolation potentielle. Ne pas connecter de dispositif médical avec un appareil de sport.

7.4.8 Connection of external host and / or auxiliary devices via interface

Many optional and host devices (e.g. ECG, spirometry devices, EMG, etc.) which can be connected to the treadmill via interface are neither made nor supplied by h/p/cosmos.

- Only devices and software which are explicitly declared as compatible by the treadmill manufacturer and the manufacturer of the host device (e.g. ECG, spirometry devices, EMG, accessories, software, etc.) are allowed to be connected to the treadmill.
- It is not allowed to connect medical devices (for instance ECG systems) to sports running machines.

The summary of clinical data and the risk management of h/p/cosmos covers only the medical treadmill ergometer and the “intersection” of the risks which arise out of the stress test in ergometry in connection with the host devices (e.g. ECG, spirometry devices, EMG, etc.).

The summary of clinical data and the risk management of h/p/cosmos does NOT cover any parameter and/or vital functions which are measured and/or detected by host devices (e.g. ECG, spirometry devices, EMG, etc.) connected to the treadmill.
For this purpose there are clinical evaluations and risk management processes to be established and performed by the respective manufacturers of these host devices on an individual basis.

Accessory equipment connected to the analogue and digital interfaces must be certified according to the respective IEC standards, e.g. IEC 950 for data processing equipment and IEC 60601-1 for medical equipment.

Furthermore all configurations shall comply with the valid version of the system standard IEC 60601-1-1, IEC 60601-1-2, IEC 60601-1-4 and IEC 60601-1-6. Always use IEC 60601-1 approved potential isolation components when linking medical devices via interface.

Anyone who connects additional equipment to the signal input or signal output of a medical device configures a medical system, and is therefore responsible that the system complies with the requirements of the valid version of the system standard IEC 60601-1-1, IEC 60601-1-2, IEC 60601-1-4 and IEC 60601-1-6.

h/p/cosmos only approves the interface protocol „coscom v3“ for medical applications and herewith confirms the (since March 21, 2010 (MDD / Directive 2007/47/EC)) mandatory conformity of coscom v3 according to the norms EN 62304 (Life Cycle Requirements for Medical Device Software; Medical Device Software Life Cycle Processes) and EN 14971 (risk management for medical devices) as well as the compliance to a very high safety standard.

All other interface protocols (older versions coscom v2, coscom v1, coscomekg.dll, other treadmill manufacturers, etc.) are not validated by h/p/cosmos according to the norms EN 62304 and EN 14971 and must not be used for medical applications (e.g. ergometry, stress-tests, cardiorespiratory diagnostics, performance diagnostics, etc.) since March 21, 2010 in connection with h/p/cosmos treadmills or h/p/cosmos OEM treadmills, except where explicitly approved and confirmed in writing by h/p/cosmos and the respective manufacturer!

We strongly recommend updating to the latest h/p/cosmos coscom v3 interface protocol. The latest coscom.dll and implementation notes can be found on www.coscom.org. If you have any questions, please contact service@h-p-cosmos.com

7.4.9 Programmable, electrical medical systems (PEMS) / In-house production

In the event that a user connects standard components to support, diagnose or appraise in terms of in-house production according to § 12 MPG (Medizinproduktegesetz = German Medical Devices Act), he creates a system and therefore has to perform and verify a simplified conformity validation process. An in-house production exists when the manufacturer creates a product or system which is used for diagnostics and/or therapy.

The in-house production of medical products is regulated by the 3rd MPG revision law. According to this, § 12 is only valid for devices and systems which are created and only applied at the operating place. This means neither the manufacturer nor the user is allowed to put these devices and systems into circulation or give them to third parties on the single European market.

A simplified conformity evaluation process means the user does not need to create a declaration of conformity or to inform the notified body, but has to demonstrate the compliance with the essential requirements, incl. clinical evaluation, risk management and the requirements of documentation.

Requirements of EN 60601-1 3rd edition, chapter 14.13 and annex H as well as chapter 16:
Connection between programmable, electrical, medical systems (PEMS) and other devices via network or data sharing respectively.

The norm requires the manufacturer to inform the responsible organization, which means the applier (hospital, medical practice, etc.), about the following risks in the technical description:

- The connection of a PEMS to a network or data sharing that includes other devices may lead to unknown risks for patients, users or third parties.
- The applier (hospital, medical practice, etc.) should determine, analyse, evaluate and control such risks. The adequate tool is the risk management according to DIN EN 14971.
- The applier must be informed that the following changes in the network or data sharing may lead to new risks and therefore require new analyses.

Changes in network or data sharing respectively may include the following procedures:

- adding new devices to the network or data sharing respectively
- removing devices from the network or data sharing respectively
- devices connected to the network or data sharing respectively have to be state of the art
- improvement of devices connected to the network or data sharing respectively

Important information:

- In case the manufacturer declares multiple sockets as valid, these must not be located on the floor in order to prevent soaking by liquids or mechanical damage.

h/p/cosmos herewith informs about all above and below mentioned risks, warnings and obligations.

Responsibility for system integration:
The operator of ME equipment and ME systems (ME=medical-electrical) is to appoint a so-called system integrator, responsible for taking care of the tasks that result from the norm. For this reason even ME devices are used which were not primarily designed to work with other devices or ME devices or ME systems. Therefore, the norm requires a systems integrator, also known as a system administrator, who is responsible for ensuring that all individual ME devices work satisfactorily in an integrated system.

The system integrator has to perform the following tasks and must have knowledge of:

- how to use the integrated system
- the requirements for the performance of the integrated system
- what the proposed system configuration looks like
- what restrictions exist regarding the expandability of the system
- documents relating to the specifications of all ME devices and other devices to be integrated
- the performance of each ME unit and other devices
- the information flow within and around the system

Manufacturers are normally not able to take over the task of a system integrator in the hospital because they neither have the complete information nor the data that were previously listed. The norm limits the liability of a manufacturer to supplying the required information on their device. Liability cannot be split between different manufacturers. An operator such as a hospital or medical practice can, of course, hire a manufacturer or service provider to integrate their system. In this case, the entire system becomes an ME system. It is the hired manufacturer / service provider who takes the responsibility to create a properly integrated system.

The system integrator should have the expertise and experience to identify dangers and assess the most likely result of the integration of a system and to ensure that remaining potential risks are identified during the operation of the system.

For the system integrator this means:

- he has to plan the integration of all ME devices or ME systems and all non-medical devices according to the manufacturer's instructions
- he has to perform the risk management for the integrated system
- he has to forward any manufacturer's information that is needed for the safe use of the integrated system to the applier (hospital or medical practice).

The norm requires manufacturer information to include information and warnings about hazards that can arise from configuration changes (upgrades, updates). This means that manufacturers must report all information regarding software updates and upgrades as well as hardware modifications to the designated system integrator.

The operator should ideally create a complete documentation of both network-based systems, including telemedicine systems, and changes (technological changes, software changes, upgrades, etc.) and update the document accordingly.
For this job the system integrator has to be familiar with and know how to apply the risk management norm EN 14971.

The following possible sources of risk in a network or data network may occur:

- data loss
- inappropriate data exchange
- data corruption
- inappropriate time allocation data
- unexpected data received
- non-authorized access to data
- destructive data

Examples of ME equipment and ME systems on the network and data network:

- modality connectivity via network to PACS and WEB-based electronic image distribution
- server-based database for long-term ECG devices or stress test systems
- telemedicine applications
- Wi-Fi connectivity of patient monitors
- et. al.

Appendix A of DIN EN 14971 includes questions to identify characteristics of a medical device that may have security implications. The application of this annex to the causes and risks of networks and data networks should at least, according to DIN EN 60601-1, include the following considerations or risk and potential causes respectively:

- telemedicine and tele-service with external access to internal network or data network of an operator (hospital or other)
- remote service of modalities manufacturers
- compatibility of operating systems
- changes and upgrades of the software (operating system, applications, etc.)
- impact and consequences of patch management
- interface management (e.g. intolerance of 10 MB network cards with a 100 MB Ethernet network or other)
- connections (modification of hardware, network connector)
- protocols such as DICOM, HL7 in the network or data network
- packet address structure and bandwidth
- heterogeneous network topology
- normal network traffic and bandwidth requirements
- peak network load
- security and long-term readability of data carriers
- security against destructive software, unauthorized software updates or upgrades
- maximum acceptable response time
- acceptable error rate of the network or data network
- availability during planned and unplanned maintenance
- inconsistency of interfaces and formats, which can lead to loss of accuracy during data transfer
- etc.

Annex D of the DIN EN 14971 describes examples of risks and other factors related to the ME device and network or data network:

- What predictable abuse can occur?
- Is the connection to the network or data network carried out in accordance with the intended use or purpose according to § 3 para 10 of the Medical Devices Act?
- Could a false data flow occur from or to any connected PEMS?
- What should the medical data transferred through the network or data network achieve or what should be done with this data? What happens if the network or data network collapses during data transmission?
- Can there be any deviations from specified operating characteristics of each participating PEMS?
- What qualities and operating characteristics does a PEMS have and how and in what form may it be influenced by the network or data network?
- Does a complete description of the parameters of the network or data network exist, such as network topology, configuration, parameters, bandwidth (100 MB Ethernet, 1GB Ethernet, etc.), etc.?
- Can an overloading of the network or data connections within the network node occur?
- Is the network designed to ensure load? Does the number of planned network nodes suffice or is there redundancy? Is there a structured network cabling?
- Can use errors occur and if so, which? What training, and capabilities, does the operator need to manage and administer the network properly?
- How do the configuration and patch management of the network and connected PEMS occur? Does regular servicing change the characteristics and properties of the network or data network such as remote service? What influence do remote service, patch management, etc. have on the connected PEMS such arrangements, etc.? Does the system administrator takes care of the authorization or approval of patches on the operating system level, virus protection, etc., and does he examine the effects on PEMS and network?
- Do the medical data arrive at the right place at the right destination in their complete form? May there be unforeseen changes, the user acknowledges in time?
- Is there a readily available documentation for all hard- and software components with all updates?

IEC 60601-1 classifies networks and data networks as shown in figure 11 according to criteria A, B and C to identify a statement about the consequences and required response times. Reaction time means for connection of a PEMS to a network or data network, the time lag between the occurrence of a fault in the network or data network and the occurrence of patient harm. Table 1 contains potential risks based on severity and response time in case of data loss or alteration of data in a network or data network.

Severity	Reaction time	Network class	Example
Death or serious injury	Second(s)	A	Infusion (closed loop), lack of control of operation robot
	Minute(s)	A	Missing alarm transfer of an intensive care network
	Hour(s)	A/B	Wrong therapy data on dialysis machine or ventilator
Medium injury	Second(s)	A	Wrong alarm transfer, lack of control of operation robot
	Minute(s)	A/B	Wrong alarm transfer, lack of control of operation robot
	Hour(s)	B	Image mutilation, loss of therapy protocol
Light injury	Second(s)	B	
	Minute(s)	B	Loss of a x-ray image
	Hour(s)	B/C	Malfunction of a tele-medic connection
Minor	Second(s)	C	
	Minute(s)	C	
	Hour(s)	C	Breakdown of a tele-medic connection

Table 1: Possible risks by severity and reaction time in case of data loss or disturbances of the network or data network respectively.

Class „C“ network or data network:

All time-critical processes and applications for which a malfunction or interruption would lead to a critical situation for the patient as in an intensive care network are categorized as class C. Such a network should not be connected to the general hospital network, because such a connection might create uncontrollable risks. The accessibility of such an isolated (floating) network has to be very high; interruptions should not occur or only very seldom. For such a network the manufacturer / deliverer is the only responsible party. He must define the specifications of the network nodes to be used.

Note: In practice such an isolation of networks in hospitals can be realized only with very high technical effort or not at all. Depending on the manufacturer, the patient monitors in intensive care can also show x-ray images, laboratory data and other patient related information; this requires a connection of the intensive care network and the general hospital network to transfer data such as x-ray images form the PACS. In this case the responsibility for such networks is clearly transferred to the operator.

Class „B“ network or data network:

This category of networks or data networks includes all applications and processes, which are not time-critical and which handle therapeutic or diagnostic patient data. Such a network may be connected to another network such as a hospital network via a defined and controllable or safe interface. The standards for such a network are high so that interruptions are limited.

The specifications of such a network are either defined by the manufacturer or the system administrator who is appointed by the operator. As class B networks are usually radiological networks, it is difficult to define the responsibility for such a system when several manufacturers allocate different modules.

Class „A“ network or data network:

The general hospital network is an example for class A. Such a network or data network carries general applications including administrative or demographic patient data. The norm accepts a longer time falling out longer down times because hospitals normally avail of alternatives.

The system administrator, appointed by the operator, is responsible for such systems.

Such clearly defined, closed categorization / classification do not exist in practice. The following example shows that a mixture of the three classifications will normally be found:

A radiology network of class B sends images and diagnostic findings from the radiology network via the general hospital network of class A to a PACS server (Picture and Communication System). The radiological images are accessible to all users can be opened in the operating room, intensive care unit and so on. Some manufacturers of intensive care observation systems which, according to the norm, belong to class C, offer the possibility to show x-ray images on the bed side monitor in intensive care. Routinely a mixture of all three network classes occurs. It is important that the 3rd edition of DIN EN 60601-1 handles the increasing networking of medical technical devices with networks and server-based databases, and shows a possible solution to cover the complexity and potential risks of tele-medical techniques in form of the required system administrator or risk management according to DIN EN 14971.

Telemedicine is not yet described explicitly in DIN EN 60601-1 3rd edition, but the chapter on network and data network includes an approach to handling this development.

The standard requires that when using a network or data network with the aim of exchanging data between PEMS and PEMS or other IT devices (such as servers and databases),the manufacturer as well as the operator must have the necessary knowledge to build such networks, to serve and control, including all related processes and functions.

The standard requires, for example, manufacturers or suppliers of PEMS and / or networks and data networks to choose the configuration of their products so that they meet internationally known network standards such as Ethernet, Fast Ethernet, Gigabit Ethernet, FDDI, and others. Furthermore, the available bandwidth according to the intended use or purpose in accordance with § 3 para 10 MPG use must be appropriate. Optimal application performance must be achievable.

The third edition of DIN EN 60601-1 requires that a hospital as an operator, represented by a system integrator, and the PEMS manufacturer discuss any major technical parameters to ensure a reliable installation of a PEMS operating in a network or data network. This procedure is required to avoid unacceptable risks where possible.

Table H.4 of the standard gives an example of a collection of parameters that are needed to describe a network or a data network. This list should be considered r only a draft of a comprehensive documentation to follow.

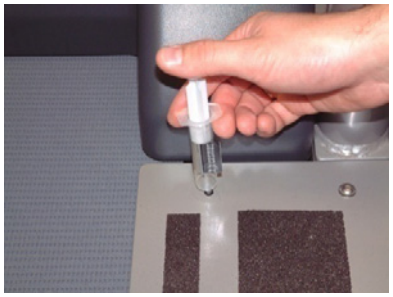
Summary:

The operation of programmable electrical medical systems (PEMS) requires the observance of and compliance with the Medical Devices Act and safety standards, as described in the technical rules (standards) to ensure quality and safe patient care. In particular, the third edition of DIN EN 60601-1 is directed much more at the operator of telemedicine connections than the second edition. In order to operate a safe and high quality tele-medicine as tele-neurology network, the safety standards should be met.

7.4.10 Installation checklist and instruction of the user

The authorized technician (distributor or service partner) checks whether the installation of the device has been performed properly. Among other things, he ensures that at least the nine points of the following checklist have been performed and/or checked before the customer is introduced to the operation of the h/p/cosmos device. For detailed information and instructions on installation and commissioning please refer to all respective chapters in this manual.
Then, the h/p/cosmos employee / h/p/cosmos partner instructs the user according to the instruction protocol in appendix 2. It is important to include all people in the instruction and commissioning who are going to work with the running machine. After the instruction is completed, the instruction protocol has to be signed by the h/p/cosmos technician and all trained persons and returned, together with the signed delivery note and the registration form, to h/p/cosmos.

No.	Illustration	Description
[01]		Compare the delivery note with the installed running machine. Are all parts (running machine, accessories, service box and running machine folder) complete and without damage? accomplished ❑
[02]		Adjust the levelling sockets. accomplished ❑
[03]		Tighten all fixation screws. accomplished ❑
[04]	 	Check the wall socket: visual check for damage, burned contacts, proper fixation and good ground contact (no paint, dirt, deformation). Check the correct pin assignment of the wall socket with a socket tester with direct indication (see picture left). As testing-device, we recommend the Testavit Schuki 3 – **[cos15900]** (separate instructions available at h/p/cosmos). Check the electrical connection: There should be a direct connection to the wall socket with separate fuse, no danger of stumbling, no extension cable, no multiple plug socket, separate circuit for the treadmill. If a correct connection to the wall socket is not possible, note this on the delivery note, inform the customer and disengage the device if necessary. Secure it against start-up. accomplished ❑

[05]		Perform an electric safety test/measurement for ▮ protective earth resistance ▮ isolation resistance and ▮ leakage current Record the test results in a special protocol [cos11690xx] and mark them as “first measured values“. One copy of this protocol remains with the owner’s manual and the original is sent to h/p/cosmos. The potential equalization cable has to be connected AFTER these measurements. accomplished ❑
[06]		Lubricate the running machine with 30 ml special silicone oil, which is part of the “service box”. accomplished ❑
[07]		Check the tension of the running belt (no slip). accomplished ❑
[08]		Adjust the running belt properly before instructing the customer. ⚠ The allen key must be pulled out of the screw immediately after usage due to risk of injury! Make sure that nobody exposes body parts, hair, clothes, ties, towels or other parts to any dangerous capture areas/gaps at moving parts such as the rollers or elevation system. accomplished ❑
[09]		Test the function of the heart rate transmission with the help of a simulator or a POLAR sender. Search for interferences and possible reasons if applicable. accomplished ❑

8 Maintenance and safety inspections

- Maintenance and repair of the devices (also opening the device) are to be performed only by service engineers authorized and certified by h/p/cosmos, preferably within the scope of a maintenance contract.
- In case of a detected and/or assumed malfunction and/or defects and/or unreadable safety labels, the device is to be disengaged immediately. Mark the device and ensure that it cannot be operated. Inform the supplier and authorized service personnel in writing immediately.
- Disregarding warnings, notifications of intended and forbidden use, precautions as well as unauthorized or lack of maintenance and/or regular safety checks may lead to injuries or death and/or can damage the device. Furthermore it will result in loss of any liability and warranty.
- Before intervention in the device, for safety reasons, switch the running machine off and pull the mains plug.
- During all maintenance work and safety tests make sure that no third parties are directly or indirectly in contact with the device under test and/or the technician performing the test. Keep a safety zone of 2 m radius clear.

Some running machine models are not equipped with a UserTerminal. For these models an additional keyboard or an external UserTerminal for remote control via RS232 is available as an option (see chapter entitled “Accessories”). For maintenance and diagnosis we recommend the use of PC software h/p/cosmos para control®
Download: www.h-p-cosmos.com/en/software/para_control.htm

8.1 Preventive maintenance

The h/p/cosmos authorised service engineers are happy to help you in case problems occur.
Preventive maintenance can prevent future problems and is indispensable for the safety of technical devices. Therefore, ask our service department for an annual preventive maintenance contract, which is highly recommended by the manufacturer. Some basic regular maintenance and regular safety checks as stipulated in the following chapters are obligatory!

Before switching the device on the user always has to check visually:

- the circuit cable
- plugs
- outlet socket
- circuit entry of the device
- accessories such as harnesses and cables where applicable and available

8.2 Immediate maintenance

Immediate maintenance is necessary if:

- the device has been under high mechanical stress (push, power supply cable and/or interface cable defect through driving over it or pulling it)
- fluid has entered the device
- cable and/or connector plug have been damaged
- coverings and/or safety warnings have fallen off / broken
- connections made of rubber show cracks (mainly the running belt and the drive belt)
- the running belt does not run concentrically
- the running belt is not well-lubricated
- a defect or malfunction of the device has been detected or is suspected.

Only a properly and regularly serviced device is safe.

8.3 Regular inspections / examinations

For use in sports and medical fields as well as for private, public and military applications, refer to the date on the inspection sticker on your device.

To keep the condition of the device in due order, examinations have to be performed regularly according to the local laws and requirements of your country (e.g. in Germany based on BGV A3, regulations for prevention of accidents as well as safety requirement inspections in accordance with MDD Medical Device Directive, etc.).

For h/p/cosmos sports and medical running machines and ladder ergometers, a maintenance interval respectively technical safety checks of one year have been set. These examinations are only to be performed by trained and authorized electricians.

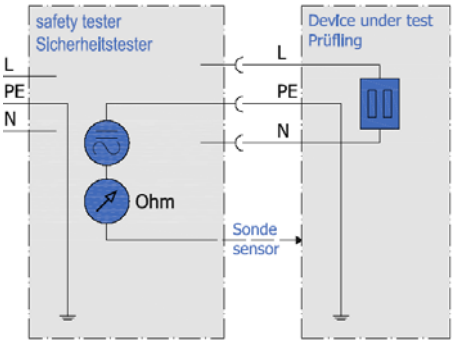
The main inspection sticker on the device (e.g. running machine) also certifies the inspection of the optional equipment and the accessories. However, inspection intervals for optional equipment and accessories (e.g. rope of h/p/cosmos airwalk unweighting system, chest belt for safety harness, compressors, etc.) may deviate significantly from inspection intervals of the main device. Read the manuals for details.

For all required measurements and control steps consider also local requirements of your country and see detailed instruction and protocol form order no. [cos11690xx].

8.3.1 Visual inspections

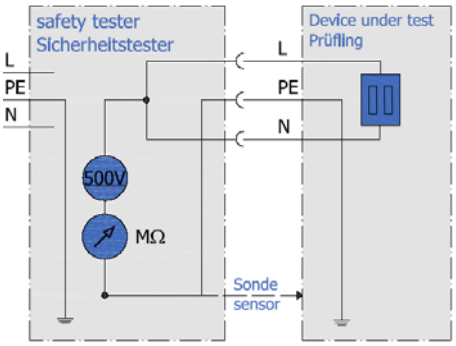
- Carry out visual inspection for damages of device and complete accessories: internal space, engine compartment, connecting lead and the right position of the tensile relief and plug, ground wire connections, etc.
- Carry out visual inspection of mechanics and wear and tear parts: driving belt, tension roller, running belt, lifting element with fixing bolts, welding seams at the frame, tight fitting of all screws and nuts. Follow the appropriate maintenance list.
- Clean device and engine compartment/internal space. Remove dust and dirt from the cooler openings of the fan housing and the cooling air ducts of the drive motor, as well as from the ventilation slots and the cover of the perforated plate of the frequency inverter.
- Attach legible and complete hazard notes according to the instructions. Check the warning signs, protective covers, step platform, engine hood and plastic cover installation channel in the engine compartment for damage and replace if necessary.
- All protective resistance connectors which can be reached from the outside must be examined for their correct value and correct labelling.
- Check capture slot at the rear end and at reverse belt rotation in the front as well and adjust if necessary. Capture slot has to be < 8 mm, according to regulation draft 60601-2-xx © IEC:200X 62D/479/NWIP 2003-05-18 and according to EN 957-1. See chapter entitled “Test finger“, which has a diameter of 9.5 mm (± 0.1) at the front.

8.3.2 Protective earth resistance (R_{PE}) measurement



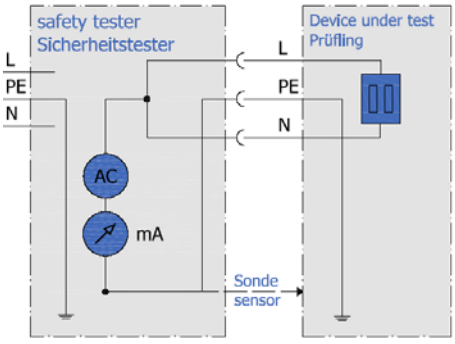
- Resistance between housing and protective earth connection.
- The low resistance pass is to be controlled according to VDE 0701/0702 (sports and fitness machines) or VDE 0751/IEC 60601-1 (medical devices) by the protective resistance measurement with a measuring device for the protective earth resistance measurement.
- The connecting lead is to be moved while measuring for at least 5 sec. If the resistance thus changes, it is highly probable that the cable or the connectors have been damaged. In this case the cable should be replaced and the device repaired immediately.

8.3.3 Isolation resistance (R_{ISO}) measurement



- Resistance between „bridged“ L+N and Protective Earth-Connection.
- Make sure that all isolations that are under stress of the mains voltage, are considered. All switches and contactors should be connected.
- The measurement is to be performed with measuring devices for the isolation resistance measurement according to VDE 0701/0702 (sports and fitness machines) or VDE 0751/IEC 60601-1 (medical devices).

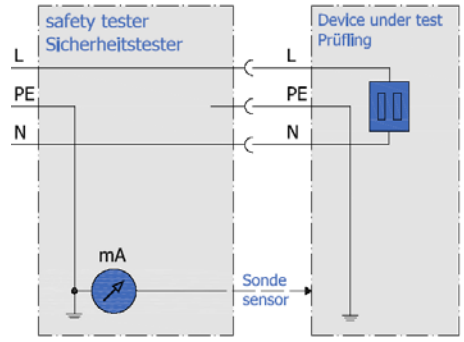
8.3.4 Equivalent (alternative) leakage current (I_{EDL}) measurement



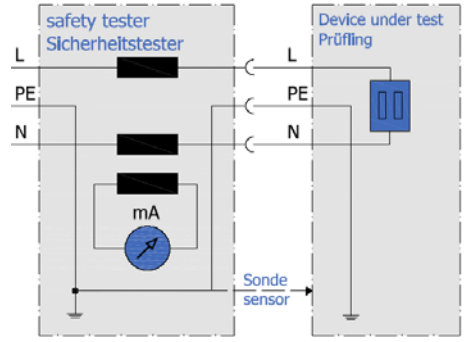
- Impedance measurement, indicating the current in the protective earth cable
- The measurement is to be performed by a measuring device for leakage current measuring according to VDE 0701/0702 (sports and fitness machines) or VDE 0751/IEC 60601-1 (medical devices).
- The measurement is equivalent to the single fault earth leakage current based on IEC 60601.

8.3.5 Leakage current measurement

direct method: measurement in PE - line



Differential current method: supply/return line



- The measurement is to be performed by a measuring device for leakage current measuring according to VDE 0701/0702 (sports and fitness machines) or VDE 0751/IEC 60601-1 (medical devices).
- The leakage current of the equipment is to be measured under operating conditions if - despite closed switching - not all isolations are considered
- Measurements must be made on both poles.
- The unit to be tested must be isolated against earth potential.
- The measurement is equivalent to the earth leakage current with grounded applied parts based on IEC 60601.
- During the direct method, the device being tested is temporarily without PE-connection. Especially devices without potential isolation transformer (sports devices) temporarily have a voltage of approx. 120 volts on the metal housing and frame parts. Do not touch the device being tested during this measurement!

8.3.6 Electric safety tester and measurements

Picture: example for electric safety tester based on IEC 60601-1.

For all measurements read operation manuals of the measurement devices carefully and verify the values and intervals with the local guidelines and laws. An appropriate inspection record for all measurements and instructions is available at the manufacturers. See also detailed instructions and special protocol [cos11690xx]. Upon first installation at the customer's site and before first commissioning of the running machine, the "first measured values" have to be determined and recorded on the special protocol and marked as "first measured values".

During each preventive maintenance and/or regular maintenance and/or after each repair of the device (even if it was only mechanical repair work!), all above-mentioned electric safety measurements and checks (see protocol [cos11690xx]) are to be performed again. All values have to be compared with the "first measured values" and permissible range of tolerance specified in VDE 0701/0702 (sports and fitness machines) or VDE 0751 / IEC 60601-1 (medical devices).

In case the measured values are not within the permissible range of tolerance specified in VDE 0701/0702 (sports and fitness machines) or VDE 0751 / IEC 60601-1 (medical devices), the device must be repaired until the values are within the specified range of tolerance. In the event that the device cannot be repaired accordingly and immediately, it must be marked and secured against further operation. Inform the supplier and authorized service personnel in writing immediately.

8.3.7 Building installation: Electric checks, protective earth function, RCD, leakage current

The customer/operator has the duty to check the building installation (electrical installations and stationary installations) at regular intervals according to regulation BGV A3 of the professional association respectively the stipulations of the legal accident insurance every four years, at their own response and expense, for the correct functioning and safety of the complete electrical building installation. For operating sites or special rooms such as environmental / climate chamber, pressure chamber, installation with extraordinary hazards, the prescribed interval is one year or shorter, if applicable. All mentioned special installations are only available at extra charge and with special design!

Use ground wire plugs with tested ground wires only. Existent earth leakage current protection switches, so-called RCD (residual current operated protective device), at the building installation must be tested by the customer/operator on a monthly basis for proper functioning. The RCD switches are located in the fuse box of the building installation and are generally labelled "press monthly".
The testing procedure normally involves pressing a button at the RCD switch (not the "main handle"), thereby simulating an earth leakage current. The RCD switch will then shut down the electricity supply. These tests should be carried out by the customer/operator when the normal operation is not disturbed and all electrical devices and computers are switched off and nobody is endangered.
The RCD switch test may cause a shutdown of the complete or partial power supply of the building, depending on the electricity circuit.

It should be pointed out that these are not regulations, standards or safety checks specifically for h/p/cosmos running machines, but rather apply to all electrical devices and building installations worldwide, including all electrical devices with metal housing.

8.4 Lubrication of the running belt / running surface

Do not touch the running belt while it is in motion.
This maintenance must be supervised by a second person, who could press the emergency stop button if necessary.

The lubrication level must be checked periodically by the user. For this procedure, unplug the running machine from the power supply, place a hand between the running belt and running surface to ensure that the surfaces are oiled and not dry. A special "lubrication test", utilizing a tissue [cos14379]) is available from h/p/cosmos as an alternative way to check the lubrication level of the running belt and deck. The use of bikes, wheelchairs or skis on the running machine as well as environmental conditions will affect the lubrication interval!

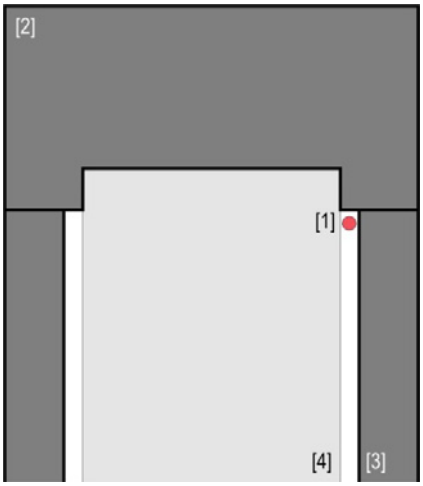
Running machines with automatic oiling systems (i.e. venus r and saturn r) must also be checked periodically by the user to ensure correct lubrication levels as the type and frequency of use can influence the amount of oil needed. (This can be compared to the need to check a car's engine oil periodically as oil usage depends on driving style and can vary dramatically). h/p/cosmos should be contacted immediately if dry chafing noises are heard during use or oil is noticed on the running deck. An h/p/cosmos authorized technical service engineer will then advise what corrective action needs to be taken.

Use original h/p/cosmos special oil only. The use of other oils or the failure to lubricate regularly may damage the running belt, running deck or the lubrication system and reduce warranty and liability. h/p/cosmos recommends a maintenance contract with an authorized h/p/cosmos service partner. Routine maintenance does not reduce the necessity to regularly control the lubrication levels. Regular maintenance and maintenance of the correct lubrication levels greatly prolong the life of the running belt and running deck!

8.4.1 Devices with UserTerminal and without automatic oil-pump

Devices with a UserTerminal are equipped with an automatic oil indicator in the UserTerminal display. At the standard setting the word OIL flashes on the display after 1000 km. (Special devices may have different intervals.) After lubrication, reset the oil message to "OP01". The device has no sensor and the oil message will not disappear automatically after lubrication! The lubrication of the running belt and running surface is done with the accessories (bottle of lubricant and 10 ml syringe) in the scope of delivery.

Use only the provided lubricant. Other available oils and lubricants may damage the running belt and running surface and lead to a breakdown of the running machine. Lubricant is available on request at h/p/cosmos. The running belt should be lubricated after 1000 km at the latest and/or if dry grinding noises are heard during operation. Special devices may have different lubrication intervals.

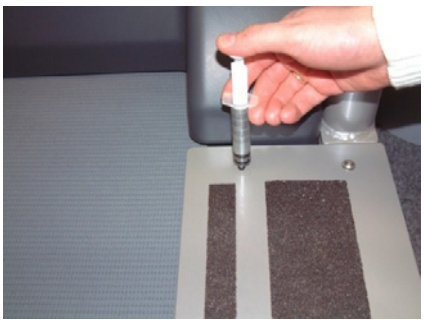


Use the oil filling hole [1] at the right hand side in front of the motor hood [2] between the footboard [3] and the running belt [4] to refill oil. The lower surface (gliding on the deck surface) of the running belt has a fabric construction which accumulates and distributes the oil until the next oiling is due.

Oiling amount

Oil in the amount of 3 syringes each filled with 10 ml of silicone oil. (Special devices may have different oiling amounts - see delivery papers). In addition, 1 syringe filled with air should be added in order to empty the oil line in the running machine.

Procedure



- Start the running machine at a max. speed of 5 km/h.
- Fill the syringe with 10ml of the lubricant.
- Insert the syringe into the oil-filling hole and press the content in slowly.
- Repeat this procedure two more times.
- Fill the syringe with air and slowly press the air into the oil-filling hole. This will empty the small oil-tube of the running machine.
- Clean the area around the oil-filling hole so that it is free of spilled oil.
- Let the running machine operate for a few minutes at the speed of 5 km/h, so that the oil is distributed on the inside of the running belt. Walk for 2 minutes at very low speed (ca. 2 km/h) while varying your position on the running belt. This will allow the oil under the belt to distribute evenly.
- Check the position of the running belt after lubrication. The belt should be in a centre position on the rear roller (tail shaft). If the belt needs to be adjusted, please follow the separate instructions.
- After lubrication, the oil message should be reset to "OP01" (see “Reset of oil-message” in chapter entitled “Optional functions”). The device has no sensor and the oil message will not switch off automatically after lubrication.

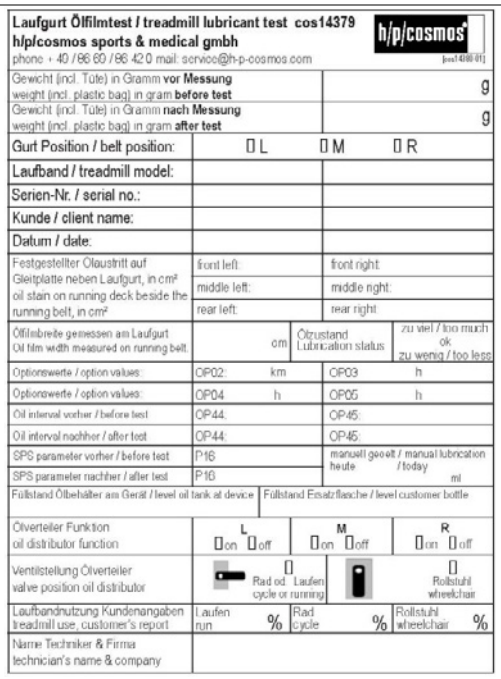
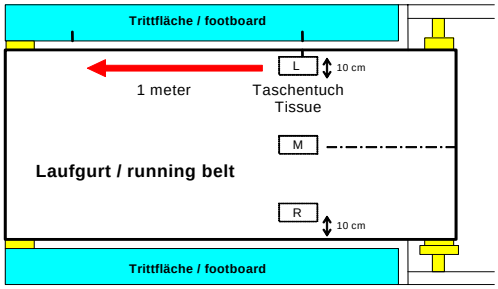
This oil type must not be used for running decks suited for cycle and wheelchair applications (e.g. saturn 300/100r); neither should it be used for oil-tanks with an automatic oil-pump. (See separate chapters.)

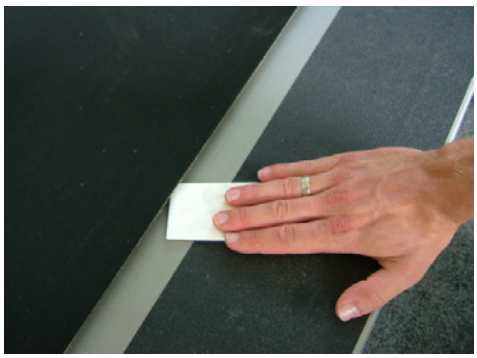
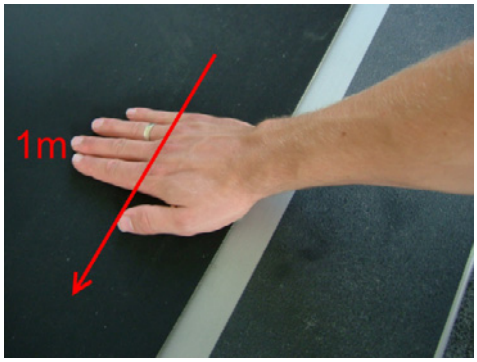
Special oil 0.25 l – bottle for sliding plate with manual lubrication [cos000200008001]
Syringe 10 ml for lubrication of sliding plate [cos12181]

8.4.2 Lubrication film test

The condition of the oil film between running surface and running belt can be determined with the lubricant test [cos14379]. The lubricant test consists of a pre-weighed commercial paper tissue. The tissue is pulled through the gap between the running belt and running surface for a defined length in order to absorb a certain quantity of lubricant. Based on previous experience, h/p/cosmos is able to evaluate the quantity of oil absorbed by measuring the difference in weight. However, the user should realize that this test can only show approximate values and trends and is not meant to replace the direct inspection by an authorized h/p/cosmos technician at the prescribed time intervals.

For security reasons, the running machine must be switched off and the power plug must be pulled for full separation from the mains.

step	Action	reaction / display
[01]		3 pre-weighed paper tissues [cos14379] are required for the test. Each tissue is located in a separate plastic bag. The information (blue letters) in the left picture should be entered on the sticker on the plastic bag.
[02]		The tissue-test needs to be performed at 3 positions under the running belt: - left edge - centre - right edge A separate tissue has to be used for each test!

[03]	 	1. Take the tissue out of the plastic bag and place it directly on the previously marked position under the running belt. 2. Press your hand on the running belt above the tissue and move the running belt together with the tissue for exactly 1 meter. 3. Remove the tissue and put it into the corresponding plastic bag. Take care that the plastic bag is closed properly. Repeat steps 1 to 3 for the remaining positions.
[04]	After all required steps have been performed, return the tissues to h/p/cosmos for evaluation. The tissues will be weighed again. A weight difference indicates whether the lubrication interval needs to be adjusted.	

8.4.3 Devices without UserTerminal and without automatic oil pump

Devices without a UserTerminal are equipped with an automatic acoustic signal (bleep) indicating the device needs to be lubricated. At the standard setting, the acoustic signal will occur after every 1000 km of operation. (Special devices may have different intervals.) After switching on the device using the main power switch, the acoustic signal will be repeated three times: 5 times LONG (code for "0"), 1 time SHORT and 4 times LONG (code for "1"). The device has no sensor; the oil message does not disappear automatically after lubrication.

Lubricate the running belt and running surface with the enclosed bottle of lubricant and 10 ml syringe, included in the scope of delivery. Do not use other lubricants as they may damage the running belt and surface and cause a breakdown of the running machine.

Please contact h/p/cosmos to order the special oil. The running belt should be lubricated after 1000 km at the latest or/and if dry grinding noises are detected during operation. Special devices may have different intervals. After lubrication the oil message should be reset with "OP 01". This requires an external UserTerminal or PC software h/p/cosmos para control®.

8.4.4 Devices with UserTerminal & automatic oil pump (models "r" for cycle & wheelchair)

Running machines which are designed for cycling and wheelchair use are equipped with an automatically controlled oil-pump and an oil tank.
The oil tank is located in the external control unit of the device below at the left. For devices constructed before 2002 and without external control unit, the oil tank is located at the rear of the machine, close to the drive engine.

The picture shows the oil pump with the valve cock (red arrow). The valve for running deck lubrication is to be positioned horizontally or vertically, depending on the application on the running surface (see illustrations next page). The valve cock should always be rotated up to the mechanical stop. Intermediate positions are not allowed and can result in serious damage to the machine.

The correct quantity and quality of oil is especially important for running machines designed for cycling and wheelchair applications. For those models a lubrication test (tissue-test) according the instructions (available from h/p/cosmos) should be performed during the obligatory yearly maintenance. The test should be sent back to h/p/cosmos for evaluation.

User cooperation and inspection obligation:
User cooperation and inspection is mandatory especially for treadmills designed for cycling and wheelchair application (all types of point loads on the running surface or the running belt). The lubrication quantity and quality between running belt and running surface should be monitored replenished as necessary. See separate instruction entitled “lubricant test”.

- Warning! Only special treadmills with special labelling are adapted for cycling and wheelchair applications! Treadmills which are not designed for cycling and wheelchair use or for use with spikes or ski sticks will be damaged by such applications.
- Due to environmental influences, interior climate and type of application (for example frequent short-run operation or infrequent long-run operation, etc.), the required automatic oil setting of the treadmill can deviate extensively from the factory setting.
- In the event that the machine is not supplied with the required lubrication quantity and quality, premature damage of running belt and surface may occur. In this case warranty will expire.

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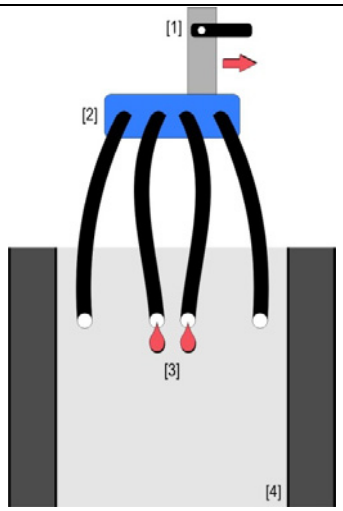
running, cycling, cross-country, skating [inline, roller ski]

Valve cock position [1] horizontally: the distributor [2] is adjusted for lubrication [3] only in the centre of the running deck [4].

The valve cock position only influences the distribution of the oil amount to the various oil outlets (tubes).
The total oil supply amount of the oil -pump always remains constant, independent of the valve cock position.
The control lamp “Empty oil tank” on the external control unit indicates a nearly empty oil tank. Refill the oil-tank when the control lamp illuminates.

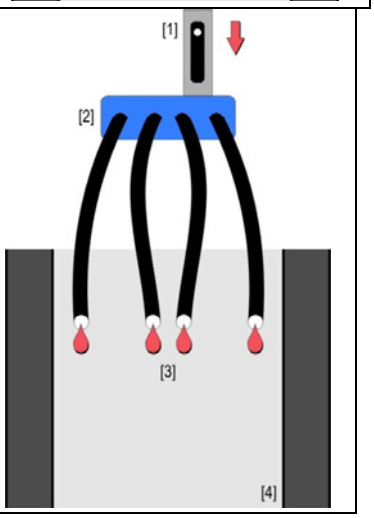


wheelchair

Valve cock position [1] vertically: the distributor [2] is adjusted for lubrication [3] over the entire width of the running deck [4].

The valve cock position only influences the distribution of the amount of oil to the various oil outlets (tubes). The total oil supply amount of the oil pump always remains constant, independent of the valve cock position.

The control lamp “empty oil-tank” on the external control unit indicates that the oil tank is nearly empty. Refill the oil-tank when the control lamp illuminates.



At standard settings the word “OIL” will flash after 1000 km of operation. If this occurs, check the oil level in the oil tank and refill preterm if necessary.
Because the device does not have a sensor, the oil message will not extinguish automatically. After checking the oil level, the message has to be reset with “OP01“.

8.4.5 Refilling oil tank

- Unplug the device and wait for one minute.
- The oil tank is located in the external control unit of the device below at the left. (For devices constructed before 2002 and without external control unit, the oil-tank is located at the rear of the machine close to the drive engine.)
- Open the lid of the tank and refill the oil-tank with approximately 0.5 litres of the provided original oil, which can be ordered at h/p/cosmos. For devices constructed before 2002 and without an external control unit, add approximately 1 to 1.5 litres)
- Close the lid of the oil-tank, plug in the power plug and switch the device on.
- Check control lamp on the external control unit. If it is no longer illuminated, the oil-tank has been sufficiently refilled.
- If necessary, reset the oil message with „OP 01“.

Special oil for sliding plate with automatic lubrication/0.25l bottle [cos14007]
Special oil for sliding plate with automatic lubrication/0.50l bottle [cos13438]

8.4.6 Resetting of oil message

An external UserTerminal or the PC-software h/p/cosmos para control® is required for devices without UserTerminal.

Initiation: running belt is not moving. One of the mode LEDs ⊙ is flashing: manual, profile, cardio, test

Step	Activity	Keys	Response/Display
[01]	Select of the mode for "user options" (OPxx)	- + STOP press 3 keys simultaneously for at least 3 seconds	SPEED indicates: OP01 flashing (for option no. 01) TIME and INDEX indicate: E.rE SEt (for error reset)
[02]	Confirm option no. 1	START ENTER	DISTANCE indicates "donE" to inform you that the oil message must be deleted.
[03]	Delete message	START ENTER	SPEED indicates: OP01 flashing (for option no. 01) TIME and INDEX indicate: E.rE SEt (for error reset)
[04]	Quit option mode	STOP	Stand-by mode ⊙ manual, profile, cardio or test is flashing

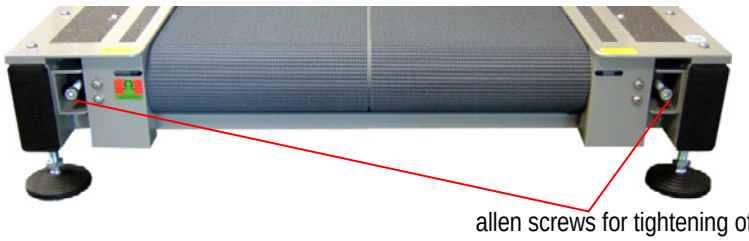
8.5 Control and tightening of the running belt

The belt may loosen after a while or if it has been adjusted wrongly. In this case a backlash occurs between the driving shaft and the belt, i.e. when weight is applied to the belt by stepping on it, the belt slows down.

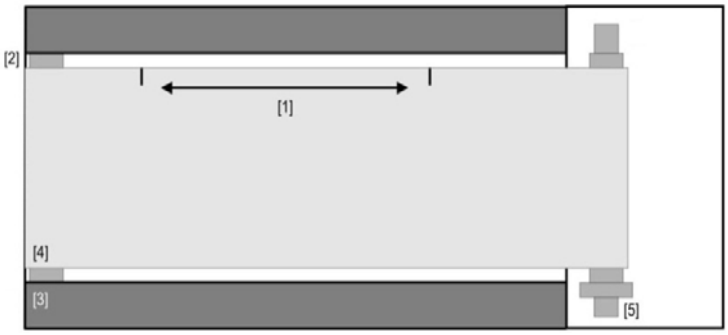
The belt tension should be checked as follows:

- Visually inspect the surface for cracks. In case of a crack replace running belt immediately.
- Open the motor hood at the front. Take care that nobody gets his hands into the motor.
- Press the "START/Enter" key for manual mode and select a speed of 1 to 1.5 km/h with the help of the "+"/"-" keys.
- Stand on the running belt. Hold on to the side handrails with both hands and try to block the rotation of the running belt by stemming yourself against the belt with your feet. If necessary, 2 people can do this.
- Try to block the movement of the running belt for max. 10 seconds. The driving shaft and the motor shaft should not be turning during that time. Otherwise the running belt has to be tightened (or the driving belt).

If the running belt is blocked too long, the motor regulation can switch off because of excess current, which will be indicated by an error display. In this case, switch off the device for 5 minutes and then switch it on again. The belt tension should not be more than 0.5 %, otherwise it could damage the belt, the shafts or the bearings!



allen screws for tightening of running belt tension



Procedure

The correct belt tension is between 0.4 - 0.5 %. Mark a line of 1000 mm [1] when the belt [4] is completely loose. Tighten the belt until the line is expanded up to 1004 - 1005 mm (= 0.4 to 0.5 %). For models with a running surface up to 190 x 65 cm, the belt is tightened with a hex socket (8 or 10 mm) at the rear deviation shaft [2]. All bigger models are tightened at the front deviation shaft [5]. The correct belt tension is achieved by turning the left and right adjustment and tightening screws (hex sockets) clockwise. The belt can be tightened until the shaft no longer turns when the belt is blocked.

⚠	The allen key must be pulled out of the screw immediately after usage due to risk of injury!

The oversize machine h/p/cosmos saturn 450/300rs has an automatic belt tightening system with motors and sensors and does not need to be tightened manually.

8.6 Adjustment (centring) of the running belt

⚠	▪ Attention: Dangerous gap/capture area at the tail shaft at the back of the device (belt re-entry zone). Take care that long hair and loose clothing are not caught in the gap of the tail shaft. ▪ For safety reasons, the adjustment procedure must be attended by a second person who can immediately press the emergency stop button in an emergency. ▪ Switch off the running machine and pull the mains plug before intervening. ▪ In case of any maintenance work on the treadmill, ties have to be removed. The tie might be pulled in and the person wearing will be strangled.

If necessary, lubricate the running belt before adjusting it. Lubrication may have impact on the centring of the belt.
Adjust the running belt while the device is in operation with the help of the left trimming screw of the running machine. Use the enclosed hex socket (8 mm). Operate the running machine at 12 km/h without elevation. Monitor the running belt for at least 2 minutes. It should be in a centre position on the rear roller (tail shaft).

If this is not the case, please do the following:

- Move the running belt to the right by turning the LEFT trimming screw to the right.
- Move the running belt to the left by turning the LEFT trimming screw to the left.
- If the discrepancy is only minor, the screw should only be turned max. ¼ turn; in the case of major discrepancies turn the screw max. ½ turn.
- Observe the running belt after each alteration for at least 2 minutes. For control purposes, operate the running machine at 5 km/h and 20 km/h.

- The adjustment procedure is finished if the running belt stays in the centre of the rear roller (tail shaft) after having been operated at a speed of 12 km/h for at least 4 min.
- Uphill run and other running styles may lead to locomotion of the running belt. +/- 2 cm are to be considered as a tolerance zone. As long as the running belt returns to the centre at a speed of 12 km/h, it must not be readjusted. The running belt will remain in the adjusted position for a period of months if it has been adjusted correctly.
- During "reverse belt rotation" (downhill run), a re-adjustment of the belt position (centring) is required.
- By evenly turning the left and right trimming screws to the right, the running belt can be tightened if necessary. See chapter „running belt tension“.

Note: For running machines with a running surface of 200 x 75 cm and bigger, the trimming screw is located at the front deviation shaft.

⚠	The allen key must be pulled out of the screw immediately after use due to risk of injury!

The oversize machine h/p/cosmos saturn 450/300rs has an automatic belt centring system with motors and sensors and does not need to be centred manually; however, the user should observe the central belt position.

8.7 Control and tightening of the driving belt (poly-V belt system)

The correct tension of the driving belt is very important for proper operation of the running machine. If the tension is too high, this may cause defects of the motor and roller bearings. Too low tension results in the backlash of the drive belt and therefore in higher abrasion and power losses.
The poly-V belt is provided with a belt adjuster and normally requires very little tightening. The belt adjuster offers the possibility of readjustment.

⚠	- Attention: Dangerous gap/capture area at the tail shaft at the back of the device (belt re-entry zone). Take care that long hair and loose clothing are not caught in the gap of the tail shaft. - For safety reasons, the adjustment procedure must be attended by a second person who can immediately press the emergency stop button in an emergency. - Switch off the running machine and pull the mains plug before intervening. - In case of any maintenance work on the treadmill, ties have to be removed. The tie might be pulled in and the person wearing will be strangled.

8.7.1 Checking the tension of the driving belt with the “slipping-test“

The “slipping-test“ can detect if the drive belt has too low tension. The “frequency-test“ must be used (see next point) to exclude too high tension. The driving belt tension is checked as the running belt tension:

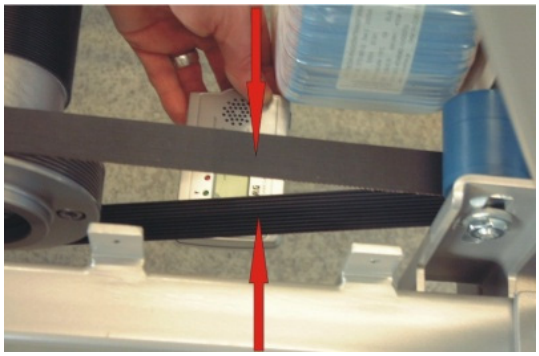
- Block the running belt at a speed of 1 - 1.5 km/h.
- Ensure that there is no backlash between the motor shaft and the driving belt.
- Ensure that the tension at the bottom run (see picture) is between 98 Hz and 103 Hz (frequency at oscillation).
- The noise at higher speeds and the correct course on the pinion should be considered.

8.7.2 Checking the tension of the driving belt with the frequency test

Check the belt tension with measuring device for belt tension [cos14863]:

- Switch off the running machine at the main switch.
- Visually inspect the drive belt for abrasion and correct fitting.
- Switch on the tuning device.
- Ensure that the tuning device is in „BASS“ mode, change with button GUITAR/BASS.
- Hold the tuning device with the microphone (MIC) close to the bottom run of the drive belt and pick the run (see picture).
- The tension of the drive belt at the bottom run (see picture) should be between 98 Hz and 102 Hz (frequency during oscillation).
- Check the tone in the display: target = 1G – adjust the tension of the drive belt if necessary.
- Check the amplitude of the needle: target 440 ... 460 – adjust the tension of the drive belt if necessary.
- When the tuning device indicates the tone 1G and an amplitude of the needle of 440 ... 460, the tension of the drive belt is OK.

upper belt run



bottom belt run / place to pick

Chart with tones to the corresponding frequency:

Target value	Frequency driving belt (Hz)	Tone	Scale
		LB	
	70	2D	420
	76	2D	455
	79	4E	425
	81	4E	440
	82	4E	440
	85	4E	447
	87	4E	457
	90	1G	422
	92	1G	425
	95	1G	432
X	98	1G	440
X	100	1G	450
X	103	1G	457
	104	3A	425
	106	3A	427
	109	3A	437
		HC	

The frequency target value is between 98 Hz and 102 Hz. This is equivalent to the tone 1G. If the result of the test is outside of this area, the tension of the drive belt must be adjusted.

frequency < value 98: belt tension needs correction to higher tension.
frequency > value 102: belt tension needs correction to lower tension.

The driving belt must be rechecked after changing the tension of the driving belt.

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8.8 Driving belt with timing belt system (from running deck size 200/75 upwards)

Timing belt drives have no automatic belt adjuster. The tension of the timing belt (depending on the model) must be adjusted by the manual belt adjuster or by changing the position of the drive motor.
The driving belt tension should be checked in the same way that the running belt tension is checked.

- Block the running belt at a speed of 1 - 1.5 km/h.
- Ensure that no backlash occurs between the motor shaft and the driving belt.
- Try to move the driving belt with thumb and forefinger 90° sidewards by using moderate force. If the angle is more or less than 90°, the tension is too high or too low and the driving belt must be adjusted.
- The noise (at higher speeds) and the correct course on the pinion should be considered.

8.9 Side step platforms: check for non-slipping

Each running machine has an anti-skid area on both sides next to the running surface. These step platforms offer safe footing if it is necessary to suddenly leave the running surface. Check the anti-skid areas at regular intervals and replace them at signs of wear and tear.

8.10 Hygiene and cleansing

- For safety reasons, switch off the device and pull the plug before cleansing, disinfecting and before opening.
- Pay attention to the safety notes, warnings and precautions of the running machine, the accessories and the disinfectant.

The h/p/cosmos devices are neither sterile nor can they be sterilized.

Pay attention to the operating instructions of the respective devices and accessories. Chemicals needed for application or cleansing should be stored in appropriate reservoirs so as not to confuse them.

The surfaces of the treadmill can be cleaned with a light moistened cloth. For disinfection h/p/cosmos recommends Bacillol plus which can be ordered from h/p/cosmos, order number [cos12179]. Before use of cleaning and disinfection substances, always test the compatibility of the substance at poorly visible places.
In the event that patients with communicable diseases use the treadmill, the treadmill must be disinfected at the discretion of the doctor or medical stuff before and after the treatment. This must also be done when a communicable disease is merely presumed. This covers all parts the patient may have contacted, such as front and side handrails, arm support, UserTerminal (keyboard and display), emergency stop, chest belt or other heart rate measurement systems, running belt, emergency stop with magnet switch, safety harness for fall stop prevention, vest of unweighting system, motor cover, frame parts, treads, wheelchair ramp, drinking bottle, etc.

8.10.1 Cleansing of outside and applied parts

Spray contact surfaces, impact, wipe and rub off. Spray disinfectant onto a tissue and rub clean any surfaces that may be contaminated.
Always follow the manual of the disinfectant manufacturer, especially the safety warning and regulations regarding disposal.

8.10.2 Cleaning of the interior

The interior should be cleaned every 6 months. The fans inside the machine and the moving running belt accumulate dust and sweat. For this reason frequent interior cleaning is highly recommended for all treadmill models.
Depending on your model, lift up the motor hood or remove bellow from upper frame. Clean the interior of the running machine by removing dirt with the help of a vacuum cleaner. Pay special attention to the ventilation net of the drive motor and the cover of the frequency inverter. For devices with an external control unit, the internal space of the control unit must be cleaned as well.

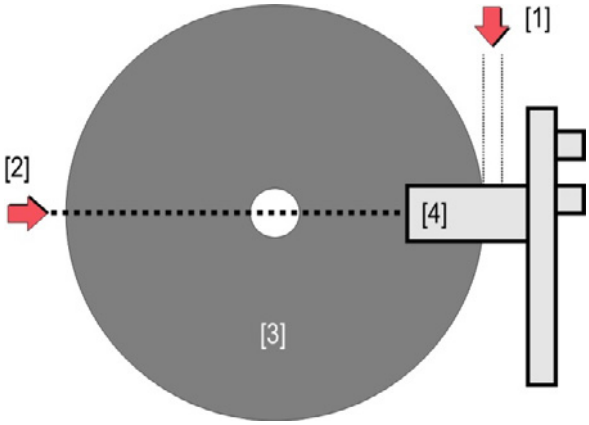
8.11 Cleansing and adjustment of the speed sensor / light barrier

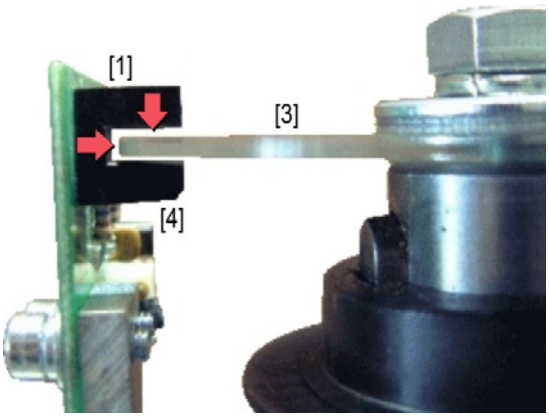
Depending on the model, the firmware version and the manufacturing date, the machines may be equipped with…

- no speed sensor (thus no cleansing required)
- light barrier and incremental waver mounted without housing at the front (drive shaft) of the drive engine.
- devices manufactured since approx. 2003 have hall effect sensors with metal toothed lock washer instead of light barriers
- only for oversize running machines with a running surface of 200/75 cm up to 300/125 cm and built before 2002: the speed sensor is mounted in its own housing at the rear of the drive engine (drive shaft), thus it must not be cleaned.

The light barrier of the drive motor is a pulse generator for the control unit. The light barrier and the incremental disc should be cleaned carefully with a cloth moistened with alcohol at intervals of 6 - 12 months. If the disc is housed, you can also clean it with the help of a bristle brush soaked in alcohol, i.e. carefully cleaning the optical elements in between disc and light barrier.

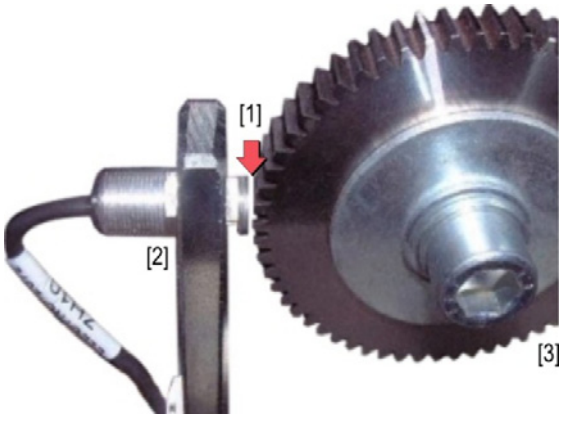
Alternatively, a spray of fat-dissolving liquid (e.g. braking detergent) with a thin spraying canal may be used. The pressure of the detergent cleans the optics of the light barrier.





When adjusting the light barrier, take care to adhere to the following guidelines for the spaces between the glass [3] and the casing [4] of the light barrier: Cleft [1] axial approx. 1 mm/radial approx. 1 mm left and right according to illustration above. The imaginary extension of the light barrier should pass through the centre [2] of the motor shaft.

Right hand side: The distance [1] between induction sensors [2] and the cogwheel [3] must be within 0,8 mm and 1,0 mm.



8.12 Light barrier at belt re-entry zones

Some models (running surface 200/75cm and bigger) are equipped with light-barriers at the running belt re-entry zone (rear position and front position for the reverse of belt rotation). As a safety measure, the light barriers affect a quick stop when the light stream is interrupted by a hand, a falling towel, a coat and by dust on the glass and/or reflector of the light barrier.

	The light barrier must not be exposed to the flash of cameras. They might turn off the running belt abruptly.

8.12.1.1 Cleaning of light barriers

To avoid unwanted activation, the light barrier and the reflector glass should be cleaned carefully with a cloth moistened with alcohol at intervals of approximately one week, depending on the air and dust conditions in the room.

8.12.2 Adjustment of light barriers

If cleaning of the light barrier is not successful, the light barrier should be checked and adjusted with respect to direction and focus. A special small screwdriver is required for adjustment of the focus. Adjustment (direction and focus) of the light barrier can be checked when the room is dark.

8.13 Spare parts & consumables

order number	description
cos12343	non slip step stripe 1350 x 25mm
cos12344	non slip step stripe 1350 x 76mm
cos12345	non slip step stripe 1570 x 25mm
cos12346	non slip step stripe 1570 x 76mm
cos12347	non slip step stripe 1770 x 25mm
cos12348	non slip step stripe 1770 x 76mm
cos14903-03-M	chestbelt system M for safety arch harness
cos11687-01	snap hook with catch for safety arch
cos14648	waist belt size M (incl. leash+magnet)
cos100420b	POLAR WIND Transmitter TRX24
cos100420c	chest belt POLAR WIND WearLink + M-XXL
cos10902	POLAR Transmitter Set T31 uncoded
cos15178	POLAR Transmitter Set T34 extended range
cos10165	POLAR chest-belt rubber-band size M (standard)
cos15933	emergency stop-button magnet holder 5m
cos100548	emergency stop-button magnet holder 10m
cos00097010034	interface connection cable RS 232 5m
cos00097010035	interface connection cable RS 232 10m
cos100815	h/p/cosmos additional keyboard incl. magnet
cos000200008001	special oil for manual treadmill deck lubrication 0.25l
cos12181	syringe 10ml for manual treadmill deck lubrication
cos14007	special oil for automatic treadmill deck lubrication 0.25l
cos14379	lubricant test tissue in bag
cos15485	h/p/cosmos drinking bottle 0.5l

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9 Trouble shooting

In case of a detected and/or assumed malfunction and/or defects or unreadable safety warning label, disengage the device immediately and mark it as such. Furthermore, secure the device against further operation and inform the supplier and authorised service personnel in writing.
See OP40 in chapter 5.10 entitled “Optional settings: User Options: With OP 41 ... 44 you can also lock separate modes (manual, profile, cardio, test).

9.1 Mechanical noise problems

If knocking or rattling noises are heard during training, please check if the machine has a firm stand and follow exactly the advice given in the chapter 7.4.5 "Mechanical installation". Most often false adjustment of the levelling sockets (adjustable "feet") at the rear of the running machine is responsible for the knocking sound.

9.2 Running belt adjustment problems

If the tension of the running belt is not correct, it is difficult to keep the position of the belt centred. The belt should be re-adjusted every time it is used in reverse direction mode. Check and follow exactly the advice in the chapter 8.5 entitled "Control and tightening of the running belt"

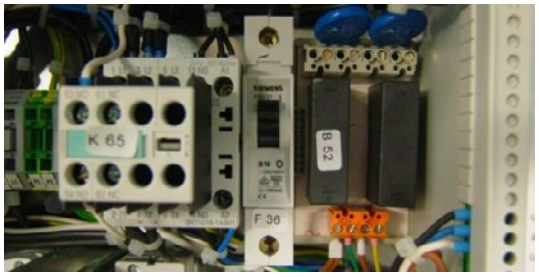
9.3 Fuses

Vor Öffnen des Gerätes Stecker ziehen.
Before opening machine disconnect mains.
Avant d'ouvrir l'appareil retirez la fiche mâle.
Antes de abrir el aparato sacar el enchufe.

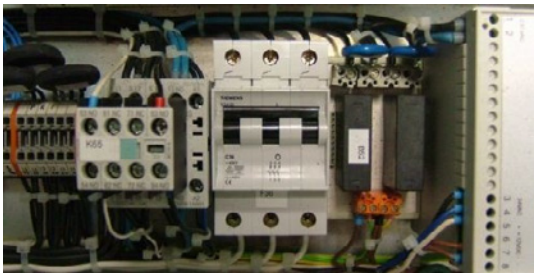
Expulsion fuse/ON-OFF button 2-pole C16A

Vor Öffnen des Gerätes Stecker ziehen.
Before opening machine disconnect mains.
Avant d'ouvrir l'appareil retirez la fiche mâle.
Antes de abrir el aparato sacar el enchufe.

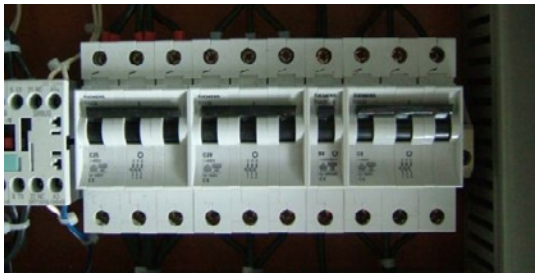
Expulsion fuse, device fuse 3-pole C16A



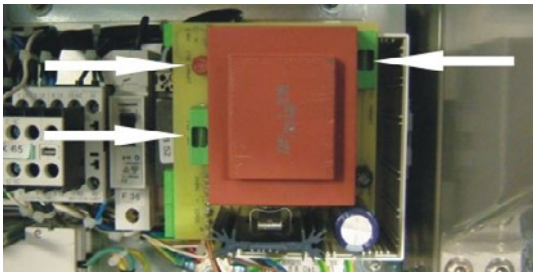
Secondary fuse isolation transformer 1-pole B16A



Secondary fuse isolation transformer 3-pole C16A



Expulsion fuse on devices with external switching cabinet



Fuses in cabinet for power supply unit

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The running machines are equipped with an expulsion fuse at the front of the device/frontal section below the hood or in the interior section, depending on the model.
The power supply for the electronic control unit is located under the motor cover. The sport and fitness machines have one secondary fuse inside the housing of the power supply, while the medical devices have two. A primary fuse is located inside the power supply cabinet, as well as two secondary fuses for 12V DC and 24V AC in medical application devices up to construction size 190/65. The secondary fuse for the isolation transformer is located beneath the engine hood of medical application devices.

9.4 Electrostatic discharge

If the user moves around the devices, they can become electrostatically charged with up to several thousand volts. If the user then touches a metal piece, keys or display, there may be an electrostatic discharge between the user and the device. Such discharge may interfere with the operation of the device. Generally, electrostatic discharges are without harm for the user as well as for the device, but can be quite unpleasant. The main causes for electrostatic discharges are the choice of clothes, the shoe soles and the movement. Very dry air and many light fittings can also lead to the same effect.
We recommend that you try different clothes or shoes, humidify the air in the room, and switch off some of the lights. Please inform the manufacturer of such interference.

9.5 Sources of interference

The device should not be installed near e.g. an x-ray device, motor or transformer with high connection power, as the electric and magnetic interference may falsify measurements. Very strong sources of interference (e.g. above the limit specified by EMT) may influence the functioning of the device.

Avoid high-tension power lines and electrical devices without CE - sign and without a certificate of compliance for electromagnetic tolerance.

Pay special attention to the advice and data in the chapter 11.5 entitled “Technical data” / “Electromagnetic compatibility (EMC) and immunity: Guidance and manufacturer's declaration”.

9.6 Voltage on the device housing / electric shock

Open (interrupted) earth wire / ground

If the earth wire (ground) is not connected (for example due to defect in the building installation), a voltage will be on the metal frame via the „Y-anti-interference capacitor“. This is very common with almost all electrical equipment with metal housing and EMC-fault clearance filters if the earth wire and/or contactor at the wall socket [1] in the building or at any other part of the AC-power line/feeder is open [2]. In this case, a voltage of approximately 110 V runs via the capacitor of the EMC-fault clearance filter (to be found in the device) between housing and earth. There is a voltage [5] of approx. 110 V AC between frame [3] and grounding [4 via the capacitors of the incorporated EMC filters, e.g. via the floor or heating radiator system or other grounded parts or machines.

a) If a sports device (without potential isolation transformer) is flawless, the current flow will be significantly noticeable when bare metal parts (for example screws) are touched.
b) If a medical device (with potential isolation transformer) is flawless the current flow will remain nearly unnoticed when bare metal parts (for example screws) are touched.
c) If either sports or medical devices are defective, e.g. because of a defective isolation inside the device, the current flow may be fatal if bare metal parts (for example screws) are touched.

⚠	Disengage the device immediately, unplug it and secure it against new start-up. Order an authorised electrician to repair the contactor circuit in the building or/and on the device.

Read and follow the directives and information concerning the check of ground-wire terminals and functions in the chapters on installation, maintenance and safety checks of this operating and service manual.

Always connect potential equalization cables as described in chapter 7.4.6.2 entitled “Potential equalization (only for medical treadmills)”.

9.7 POLAR heart rate measurement system

WARNING: Heart rate monitoring systems can be inaccurate.
Possible sources of interference:

- Screens, computers, printers, mobile phones and any radio engineering systems
- Electric devices, electric motors, transformers
- High-voltage transmission lines, also from trains
- Strong fluorescent tubes nearby
- Central heating radiators
- Other electric devices

In order to prevent interferences of the running machine, place the device at some distance away from such sources of interference. Do not rely on the indicated values if you suspect interference.
Please consult the instructions provided by the manufacturer POLAR concerning interference at www.polar.fi or at http://www.polarservicecenter.com/Frame-Troubleshooting.htm

Troubleshooting can be supported with the tool of acoustic beeps:
see chapter 5.10 entitled “Optional settings: User Options”.

Check OP07 if acoustic heart rate signal is selected.

Option	Description	Explanation / Display
OP07	Activate: Acoustic heart rate signal	HEART RATE SEX AGE WEIGHT indicates: OFF or ON OFF: No acoustic heart rate signal ON: Acoustic heart rate signal for every beat. This function is normally used to control the regularity of the heart rate or to find reasons for transmitting problems (such as mobile phones or computer monitors).

9.8 RS232 interface

The most common causes for problems with the RS232 interface are

- Wrong connection cable between the running machine and the periphery.
- Connection to the wrong COM port of the treadmill or the periphery.
- Another program, running on the external PC, is blocking the COM-port where the treadmill is connected.
- Technical defects of the connection cable or male/female connector.
- False setting of protocols/driver at running machine or periphery (ECG, PC, ergospirometry).
- False setting of COM port at periphery (ECG, PC, ergospirometry).

9.8.1 Troubleshooting and testing of the RS232 interface

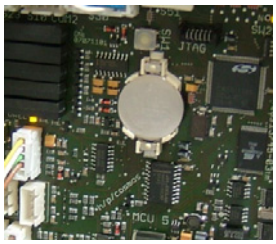
- Loop-back test: For testing the RS232 of the running machine, a special RS232 test plug including testing instruction is available from the manufacturer. Connect the plug to the RS232 port and adjust OP20: 10
- A blinking code will appear, and the instructions will tell you if input and output of the RS232 are working well.
- PC software h/p/cosmos para control®. If you install the software on an external PC, you can control the running machine. If it works, you know the running machine, the RS232 interface connection cable and the RS232 interface card of the PC are working well.
  Download the free para control software from: http://www.h-p-cosmos.com/en/software/para_control.htm

9.9 MCU control unit / circuit board, battery

In rare cases, after several years of use, malfunctions of the control unit are possible because of low battery power.
If the incorporated 3V 225mAh CR2032 battery (Lithium type) is low, all settings in the memory will be lost. It is recommended to replace the battery as a preventive measure every 5 years.
In this case, contact the service department to change the battery of the control unit.

In case of replacement see picture for right positioning of the battery.

The MCU control unit also has a number of status LEDs which can assist in diagnosis. When communicating with the h/p/cosmos headquarters during error search and trouble shooting, the authorized technician should observe the indications on these LEDs and report to the h/p/cosmos headquarters.



Picture: battery [cos12542] on the MCU5 circuit board

9.10 Error messages

Interferences and error codes might be caused by problems with the power supply or because of insufficient maintenance (lubrication of the running surface, etc.).

- Check voltage supply. Do not use extension cords or multi-way connectors. Connect the machine directly to the socket in the wall. Each machine should have an individual circuit.
- Check mechanical parts for any malfunction. Check also for towels or other objects which might interfere with the drive system.
- Check if any light barriers are dusty or incorrectly adjusted.
- Check lubrication of the running belt and lubricate if required.
- Contact problems at connectors (loose connections) caused by vibrations can result in malfunctions. Therefore please check cables and connectors for loose connections.

The device has a self-diagnosis which recognizes some errors and displays error messages at the MCU UserTerminal or the frequency changer/inverter (inside the device).

Error messages on devices with UserTerminal Initiation: Running belt is not moving. One of the mode LED ⊙ is flashing: (manual, profile, cardio, test)		
Message	Description	Explanation / Display / Activity
E01	Oil interval due	SPEED E 01 TIME OIL flashing DISTANCE ELEVATION HEART RATE HELP flashing Running machine is still functioning ▌ Every 1000 km (interval is adjustable) lubrication service is due. See chapter "lubrication of the running belt". Lubricate the belt. See chapter 8.4 „Lubrication of the running belt / running surface “ on page 112 ▌ The running machine hat noch sensor. Lubrication according to manual only. ▌ Attention: Error message does not disappear automatically, reset error message (OP 01)
E02	Service interval due or safety inspection due	SPEED E 02 TIME Service flashing DISTANCE ELEVATION HEART RATE HELP flashing Running machine is still functioning ▌ Every 5000 km (interval is adjustable) general service including interior cleansing, checking the driving belt, running belt, etc. is due. ▌ Every 12 months an electric safety inspection is due. See chapter maintenance in this manual. ▌ Contact authorized service engineer ▌ Reset error message (option 01)
E20	Elevation system exceeded max. value	SPEED E 20 TIME ELEV flashing DISTANCE ELEVATION HEART RATE HELP flashing Running machine is still functioning (except for the lift device), ▌ Lifting element exceeded the maximum value. The combined 0% / maximum % - contact has been activated ▌ Incorrect measurement of angle of elevation ▌ Maybe wrongly adjusted, dirty or defective elevation sensor ▌ Contact authorized service engineer

E21	Error of elevation system	SPEED E 21 TIME ELEV flashing DISTANCE ELEVATION HEART RATE HELP flashing Running machine is still functioning (except for the lift device) ▌ Maybe technical blocking of elevation (e.g. overload) ▌ Power supply may be too weak because of an extension cable etc. ▌ Check power supply and power cord. ▌ Elevation sensor adjustment may be wrong or the sensor is dirty or defective. ▌ Contact authorized service engineer.
E30	Error of speed / distance measurement	SPEED E 30 TIME INCR flashing DISTANCE ELEVATION HEART RATE HELP flashing Running machine can still operate for a few seconds at approx. max. 1 km/h. ▌ Running belt may be blocked (e.g. foreign object, towel trapped in device). ▌ Power supply may be too weak because of an extension cable, etc. ▌ Check power supply and power cord. ▌ Speed sensor adjustment may be wrong, the sensor may be dirty or defective or the speed calibration is wrong. OPTION 34. ▌ Safety delay time (inverter or MCU) is longer than the high acceleration command (SPRINT function or high acceleration level). ▌ Trouble shooting see administrator OPTION 48. ▌ Contact authorized service engineer. ▌ Check voltage supply. Do not use extension cords. Connect the machine directly to the socket in the wall. ▌ Check mechanical parts for any malfunction. Several persons may have been standing on the machine for a moment? ▌ Remove bellows from upper frame (where applicable, depending on frame). ▌ Attention: Dangerous voltage and danger of being hurt when the device is open. Do not touch the parts inside the device ▌ Clean the speed sensor (light barrier and disc, where applicable) and check the adjustment of the sensor according to the instructions. ▌ Check if the safety-, acceleration- and deceleration time (of the frequency inverter and/or MCU) is higher than the highest acceleration level (e.g. sprints with very high acceleration levels, and when using the SPRINT function if available). ▌ Delete the message with "OP01". In case the message appears again, contact authorized service engineer. ▌ Check also administrator OP 48. ▌ Check plug no. S6 on MCU and analogue voltage 0 ... 10 volts (for 0 ... max. speed) from MCU board to inverter drive. ▌ Check plug no. S6 on MCU and “inverter on – signal / RFR” from MCU board to inverter drive. ▌ Check mains power supply to frequency inverter.

E31	+ tolerance aberration speed sensor The measured speed-value (actual value) is higher than the calculated value (debit-value) (at least with the percentage set in administrator OP12)	SPEED E 31 TIME INCR flashing DISTANCE ELEVATION HEART RATE HELP flashing Error search see E30.
E32	- tolerance aberration speed sensor The measured speed-value (actual value) is lower than the calculated value (debit-value) (at least with the percentage set in administrator OP12)	SPEED E 32 TIME INCR flashing DISTANCE ELEVATION HEART RATE HELP flashing Error search see E30.
E41	Error during memory initialization “SETUP ERROR“ MCU or low or defective battery	SPEED E 41 TIME type INDEX OP03 flashing DISTANCE SETU ELEVATION P E HEART RATE rrOr flashing Running machine is still working. ▌ At MCU5 control electronic (as of manufacturing date 12/2007), this error shows a defect of the option memory (FRAM). In this case, please contact h/p/cosmos and request a service technician. ▌ Optional setup restores to default factory setting and device type. ▌ By pressing the key START, the device can still be used, but it is likely that individual settings and program profiles may not be available any more. Check accuracy of displayed values of speed and elevation. ▌ Press Start and STOP, power off and power on the device. ▌ If E41 is still indicated, contact an authorized service technician. ▌ MCU electronic or battery may be low or defective.
E 50	Error of frequency inverter / motor regulation At ANALOG control of frequency inverter	SPEED E 50 TIME FU flashing DISTANCE ELEVATION HEART RATE HELP flashing Running machine out of order. ▌ Check plug no. S6 at the MCU board. ▌ Frequency inverter may be defective. ▌ Power supply may be too weak because of an extension cable etc. ▌ Check power supply and power cord. ▌ Contact authorized service engineer.

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E51	Error of frequency inverter/ motor regulation Signal error between MCU5 and frequency inverter. Only applicable at digital control (RS485) of MCU5/frequency inverter	SPEED E 51 TIME FU flashing DISTANCE ELEVATION HEART RATE HELP flashing INDEX shows the hexadecimal number of the original error code of the frequency inverter (for example “b1” of error message “E.PUE” = PU disconnection). ▌ Check RS485 plug at the MCU5 control board. ▌ Check RS485 plug at the frequency inverter. ▌ Check RS485 plug at the isolator board. ▌ Frequency inverter may be defective. ▌ Power supply may be too weak because of an extension cable etc. ▌ Check power supply and power cord. ▌ Contact authorized service engineer.

abbreviations: UT = UserTerminal / FI = Frequency Inverter

Indication display UT	Indication display FI	Meaning of the error code related to the frequency inverter (motor drive control) function/ status
00	-	No alarm
10	E.OC1	Overcurrent shut-off during acceleration
11	E.OC2	Overcurrent shut-off during constant speed
12	E.OC3	Overcurrent shut-off during deceleration or stop
20	E.OV1	Regenerative overvoltage shut-off during acceleration
21	E.OV2	Regenerative overvoltage shut-off during constant speed
22	E.OV3	Regenerative overvoltage shut-off during deceleration or stop
30	E.THT	Inverter overload shut-off (electronic thermal relay function)
31	T.THM	Motor overload shut-off (electronic thermal relay function)
40	E.FIN	Fin overheat
52	E.ILF	Input phase loss
60	E.OLT	Stall prevention
70	E.BE	Brake transistor alarm detection
80	E.GF	Output side earth (ground) fault overcurrent
81	E.LF	Output phase loss
90	E.OHT	External thermal relay operation
A1	E.OP1	Communication option fault
B0	E.PE	Parameter storage device fault
B1	E.PUE	PU disconnection
B2	E.RET	Retry count excess
C0	E.CPU	CPU fault
F1	E.1	Option fault
F6	E.6	CPU fault
F7	E.7	CPU fault
FD	E.13	Internal circuit fault

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E52	Error of RS485 cable motor control Cable defect or bad contact at the connection MCU/frequency inverter Only applicable for digital control (RS485) of MCU5/frequency inverter	SPEED E 52 TIME FU flashing DISTANCE ELEVATION PROGRAM HEART RATE SEX AGE WEIGHT HELP flashing The MCU5 control boards always send a reset message every time the device is switched on. After 10 consecutive time-out failures, the MCU generates the E52 error-message. This is equivalent to a missing connection (e.g. cable defect) from MCU5 to frequency-inverter. ▌ Check RS485 plug at the MCU5 control board. ▌ Check RS485 plug at the frequency inverter. ▌ Check RS485 plug at the opto coupler board. ▌ Contact authorized service engineer.
Card Err 01	Error chip card drive (not all models)	SPEED CARD TIME OR S INDEX ENERGY POWER TART Running machine is still functioning (except chip card function). Chip card protocol active, but no chip card in chip card drive ▌ Insert chip card to the chip card drive, or ▌ Press Start to run Cardio Mode
Card Err 02	Error chip card drive (not all models)	SPEED CARD TIME ERR INDEX ENERGY POWER 2 Running machine is still functioning (except chip card function). Wrong PIN number ▌ False chip card in the chip card drive, or ▌ Too many PIN retries (wrong PIN configured)
Card Err 03	Error chip card drive (not all models)	SPEED CARD TIME ERR INDEX ENERGY POWER 3 Running machine is still functioning (except chip card function). ▌ Wrong card type ▌ no treadmill training session configured ▌ Too many training weeks (memory for training sessions is full).
Card Err 04	Error chip card drive (not all models)	SPEED CARD TIME ERR INDEX ENERGY POWER 4 Running machine is still functioning (except chip card function). ▌ Chipcard reader hardware error ▌ Unknown chip card malfunction. ▌ No card identified. ▌ Check chip card. ▌ Insert correct chip card. ▌ Reprogram chip card.

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Reset of error messages at devices with UserTerminal Initiation: Running-Belt is not moving, one of the mode LED ⊙ is flashing (manual, profile, cardio, test)			
Step	Activity	Keys	Response / Display
[01]	Select user option (OP xx)	- + STOP Press all 3 keys simultaneously for at least 3 seconds	SPEED indicates: OP01 flashing TIME and INDEX (ENERGY POWER) indicate: E.rE SEt (for Error reset)
[02]	Confirm OP01	START (ENTER)	DISTANCE indicates: done Informs you that you have to delete the oil message
[03]	Delete message	START (ENTER)	SPEED indicates: OP 01 flashing TIME and INDEX (ENERGY POWER) indicate: E.rE SEt (for error reset)
[04]	Quit user options	STOP	Standby mode ⊙ manual, profile, cardio or test is flashing

With this procedure only the messages E01-OIL and E02-Service can be reset. Other error messages are caused by technical defects/malfunctions. These error messages can only be reset in the administrator level. In this case please contact customer service.

Error messages at devices without UserTerminal

Devices without UserTerminal are equipped with an automatic error message code via acoustic signal (beep) indicating the device has a malfunction, needs lubrication or regular service. The appropriate beep-code sounds in the moment the error occurs, and afterwards when switching on the running machine if the error still exists three times in a row. To interpret the error without a display a beep-code is audible according to the error message and according to the list below:

o = long beep / x = short beep
0= ooooo / 1= xoooo / 2= xxooo / 3= xxxoo / 4= xxxxo / 5= xxxxx / 6 = oxxxx / 7= ooxxx / 8= oooxx / 9= oooox

Example OIL message E01: Acoustic signal beeps 5 times LONG (code for "0") and 1 time SHORT+ 4 times LONG (code for "1"). This is repeated 3 times. Error codes are explained in the previous chapter.

Reset of error messages on devices without UserTerminal

The OIL message and SERVICE message are quit with OP01. Other error messages have to be quit by OP01 at the administrator level. In cases, an external UserTerminal or the software h/p/cosmos para control® are needed. For further procedures see the previous chapter.

10 Optional settings: administrator options

The administrator options are only accessible through h/p/cosmos staff and authorised service engineers. Access is only possible with a special code which is not given here.
Changing an administrator option might cause serious problems if you are not familiar with all details. Therefore the h/p/cosmos service has to be contacted before modifying administrator options.
For optional settings on devices without UserTerminal, an external UserTerminal or a connected PC with the software h/p/cosmos para control® is required.

List of administrator options		
Option	Description	Comment / Display
OP01	Reset of error messages E20, E21, E30, E31, E32, E41, E50 and E51	The required maintenance work has to be performed before deleting error messages. Confirmation in the display DISTANCE with "donE". This option only resets the error message. If the error still exists, the error message will appear again.
OP02	Selection of the OEM code	By selecting the OEM code, the functions and settings of the UserTerminal are adapted to the requirements of the listed OEM partner. The following OEM codes can be selected: 0 = h/p/cosmos (standard) 1 = JAEGER / VIASYS / CARDINAL HEALTH / CARE FUSION 2 = Ergo-Fit (1997-98) 3 = Proxomed / Kardiomed 4 = KISTLER Gaitway 6 = COSMED 9 = SCHILLER Not all companies listed above are or were OEM partners of h/p/cosmos.
OP03	Selection of device type	Selection of the correct treadmill device type according to the “list of device types” in the appendix. Only the device type 0.1 and 1.1 can be confirmed on the ladder ergometer. Note: Selection and confirmation of a device type returns all user- and administrator options to default settings.
OP04	Maximum speed for reverse belt rotation (This option is only available for treadmills, not for ladder ergometers).	For safety reasons, treadmill models with a motor hood or a crossbar handrail must limit their speed to a maximum of 5 km/h during belt rotation since they have an "obstacle" (motor hood or cross-bar handrail) behind the subject during this mode. Changing this speed limitation for these models is only permissible if the safety of the runner is guaranteed (e.g. by a safety harness). SPEED indicates: maximum speed for reverse belt rotation, adjustable range from 1 km/h to maximum treadmill speed. ⊙ selected unit is blinking, ⊙ max. is blinking

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OP05	Maximum speed	The standard maximum speed of the selected device type (in OPTION 03) will be indicated in the SPEED display. Example: h/p/cosmos mercury 4.0 = 22.0 km/h; h-p-cosmos discovery 4.0 = 40 m/min For safety purposes (e.g. for beginners), the max. speed of every treadmill model can be limited. SPEED indicates: maximums speed, adjustable range from 1 km/h to maximum treadmill speed ⊙ selected unit is blinking, ⊙ max. is blinking
OP06	Maximum acceleration time in seconds (This option is only available for treadmills, not for ladder ergometers).	DISTANCE reports e.g. 131 (max. acceleration increment) ELEVATION PROGRAM reports e.g. 5.0 (max. acceleration time in seconds.) HEART RATE SEX AGE WEIGHT indicates: SEC.
OP07	Maximum elevation (This option is only available for treadmills, not for a ladder-ergometer).	The standard maximum elevation of the selected device type (in OPTION 03) will be indicated. Example: h/p/cosmos mercury = 25 % For safety purposes (e.g. for beginners, or in case the ceiling height of the room's ceiling is insufficient) the max. elevation of every treadmill model can be limited. ELEVATION PROGRAM indicates: maximum elevation, adjustable range from 0 to maximum treadmill elevation
OP08	Heart rate display interval	DISTANCE indicates heart rate display interval in seconds, adjustable range from 0 (beat to beat) .... 1 to 9 seconds Compare: An original POLAR heart rate monitor has a display interval of 5 seconds ELEVATION PROGRAM indicates: SEC
OP09	Test of all displays and LEDs	
OP10	Enter the serial number of the device provided on the nameplate	Change the values with - or +, confirm the values with START ENTER Example: Treadmill with serial number cos30000va05-0128 on the nameplate DISTANCE indicates 300 (item number of device) ELEVATION PROGRAM indicates: 0005 (item number of device) HEART RATE SEX AGE WEIGHT indicates: 0128 (serial numbers of this device family)
OP11	Activating and de-activating speed measurement	Speed measurement is normally activated / de-activated by selecting the correct device type (administrator option number 3). Only in very special cases a special adjustment in option number 11 is necessary. Speed measurement can only be activated if the device has a speed sensor. DISTANCE indicates 0 = without speed measurement / -sensor 1 = with speed measurement / -sensor (permanent control) 2 = with speed measurement / -sensor (control as of speed > 2 km/h, no control < 2 km/h)

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OP12	Setting of allowance for speed signal comparison (measurement / control) These values do not reflect the real speed accuracy of the running belt. Accuracy of running belt speed is higher.	The MCU5 control unit continuously compares the data of the speed measurement with a calculated reference value. In order to detect problems with the speed measurement or speed control or e.g. performance limitations due to a bad voltage supply, an allowance range can be set in this option. If the allowance is exceeded, the error message E.31 (measured speed is too high) or E.32 (measured speed is too low) is indicated DISTANCE indicates: OFF = no comparison 6 = 6 % deviation allowed 8 = 8 % deviation allowed 10 = 10 % deviation allowed
OP13	Activating and deactivating motor brake	The motor brake prevents the running belt from moving manually (for example due to the subject's bodyweight) when the speed value is set to "0". If the treadmill recognizes running belt movement, it activates the motor break for 10 seconds. Remark: The motor brake works only on running machines with integrated speed measurement. The speed sensor must be switched on (OP11=1). If the running machine is not equipped with a speed measuring system, this can be retrofitted easily. To activate the motor brake, some parameters of the frequency inverter must be changed. Ask the service department of h/p/cosmos sports & medical gmbh for detailed instructions. **Attention!** **If the device is switched off or disconnected from the power supply, the motor brake will not function!** **After 10 seconds of operation of the motor brake, the brake is automatically released and will only be activated again after belt movement. A short jerk may occur during reactivation.** DISTANCE shows OFF = motor brake not active DISTANCE shows ON = motor brake active
OP14	Maximum acceleration time for RS232 (option only available for treadmills, not for ladder ergometers)	DISTANCE shows e.g. 41 (max. acceleration increment) ELEVATION shows e.g. 16 (max. acceleration time in sec.) HEART RATE shows: SEC.
OP16	Activating and deactivating heart rate measurement	SPEED reports ... 0 = heart rate measurement is deactivated / OFF 1 = heart rate measurement is activated, circuit board HFU1 or RE06REC (default) 2 = heart rate measurement is activated, circuit board HFUi auto = automatic detection and activation of circuit board 4 = POLAR W.I.N.D. (further settings in user OP19 and OP23 necessary)

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OP33	Distance between rungs of the ladder ergometer (option only available for ladder ergometers, not for treadmills)	For correct calculation of the number of rungs / steps, the distance between two rungs can be changed and confirmed in this option. Standard: 254 for 25.4 cm
OP34	Manual speed calibration (counted increments from the speed sensor for 10 m belt movement) Note. Normally the speed calibration values are set by selecting the correct device type (administrator option number 3).	This value is permitted to be changed only if the final drive ratio changes. If you change the speed calibration value, please also pay attention to the correct settings in OP5 (firmware speed limit), OP11 (speed measurement; must be switched on) and OP48 (frequency inverter speed limit) of the administrator mode. To change the speed calibration value, please use the + and – buttons. For quick movements between standard values, please use the UP and DOWN buttons. If the speed measurement is switched off in OP11, OP34 will only report internal program absolute values. Otherwise, you can see the stored values in the list of running machines types in the appendix.
OP35	Oil interval	The distance interval for indication of required "OIL" service can be adjusted by means of OP 35. Standard = 1000 km for treadmills, 100 km for ladder ergometers. OIL intervals are indicated with error code "E01" "OIL" every 1000 km. DISTANCE indicates oil interval in km (standard = 1.000) ⊙ km is flashing, adjustment range: OFF, 100 ... 5.000 km Do not change the interval without prior communication with h/p/cosmos. For the models h/p/cosmos venus and saturn, JAEGER CareFusion LE 580 CE and larger as well as COSMED T200 and larger, OP35 has the standard setting OFF because the machines are equipped with an automatic oil pump and tank.
OP37	Interval for service message TSC (time-dependent) for technical safety control E.02 “HELP"	On sports devices and/or active medical devices with power supply connection used for either commercial, industrial, institutional and medical applications, regular technical safety controls have to be performed by a trained and authorised service technician. Appropriate protocols and inspection instructions are available at h/p/cosmos service. An error message "E 02" "HELP" for the TSC-service interval will appear in the display after expiration of a time period of 12 months. The remaining time period (in months) till the next TSC / maintenance / inspection can be viewed by calling up OP37. Reset of the interval and the error report „E02“ is possible via option OP47. The TSC report interval can be changed via OP37: Select OP37 and change with - or +. Confirm with START. OP37 can also be used for the adjustment of the maintenance intervals in months if the mileage is small. DISTANCE indicates: TSC-Interval in months (standard = 12 months) Adjustment range 0 to 48 months

OP38	Service interval (distance-dependent) "E 02" "HELP"	h/p/cosmos recommends regular maintenance (interior cleaning, checking drive belts, etc.) carried out by an authorized technician at least every 5,000 km (for ladder ergometers: 500 km). For this reason, the error message "E 02" "HELP" is displayed every 5000 km (500 km). For detailed information, descriptions and specifications about maintenance, please contact the h/p/cosmos service department. An error message "E 02" "HELP" for the maintenance interval will appear. TSC controls are to be performed at least every 12 months. Reset of the interval and the error report „E02“ is possible via option OP47. The service maintenance interval can be changed via option OP38. Call up OP38 and change with [-] or [+]. Confirm with [START]. [DISTANCE] reports: service interval in km (standard = 5.000 / 500) Adjustment range 1,000 to 9,900 km or 100 to 5,000 km for the ladder ergometer.
OP39	Elevation: display as set point or true value (This option is only available for treadmills, not for ladder ergometers)	0 = Display of elevation as set point 1 = Display of elevation as true value resp. flashing set point report, if the set point was changed with the keys and has not yet been reached (report: current elevation angle; recommended default setting).
OP40	Speed: display as set point or true value	0 = Display of speed as set point (report: target speed) 1 = Display of speed as true value resp. flashing set point report if the set point was changed with the keys and has not yet been reached. (report: current speed; recommended default setting)
OP41	Elevation control after STOP (This option is only available for treadmills, not for ladder ergometers).	0 = Elevation remains at the present level after pressing the STOP button (recommended; default-setting) 1 = Elevation decreases to 0 % after pressing the STOP button.
	⚠	Setting of OP 41 to value 1 affects the safety of the subject and third parties. A downward movement of the elevation after pressing STOP can result in a jumpy reaction and in severe injuries and contusions. h/p/cosmos strongly recommends adhering to the standard setting of this option. Stop means stop for all movements and must not result in activity or movement on the part of the running machine. It is only allowed to change option 41 after a written documented instruction of the user regarding the danger warnings and after a written confirmation by the customer/user.
OP46	Display and setting of elevation for ladder ergometer (only available for ladder ergometers, not for treadmills)	[ELEVATION PROGRAM] indicates elevation of ladder ergometer, standard: 75 degree, adjustable from 0 to 180 degrees
OP47	Reset of oil and service interval	After service including lubricating of the treadmill and all maintenance work, the oil and service intervals can be reset with option OP47.

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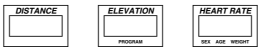
OP48	Maximum speed during maximum activation of the frequency inverter (applicable for digital RS485 and/or analogue control 0…10 volt of the frequency inverter)	The maximum frequency inverter speed is achieved if the MCU (within UserTerminal) sets the control voltage (analogue voltage for frequency inverter) at 10 V. This means maximum frequency of the inverter. The maximum speed during maximum frequency of the inverter is set with the input of the correct device type at option number 03 (OP03) of the administrator options. Option 48 is necessary for manual speed calibration or special speed transformation or drive motors (special speeds) only. When changing OP 48, always pay attention to the correct setting of the OP 05 (maximum speed), OP 11 (speed measurement; has to be switched on) and OP 34 (speed calibration value). Examples for the different special speeds and the appropriate maximum inverter frequencies are to be found in the list in chapter 10.1 entitled “List of running machines types” ▌ Make sure that the correct device type is set at administrator OP03 ▌ Go to administrator OP 05 and set maximum possible speed. ▌ Set the device in the manual mode to the maximum possible speed by using key "+". ▌ Check the analogue voltage at the MCU-FU control with a volt meter. It should be 10 V. Make a note of the voltage in the service report (not possible with digital control via RS485)! ▌ Read the speed and make a note of the value in the h/p/cosmos service report: OP 48: _____ km/h ▌ Stop the running belt with the STOP key. ▌ Go to administrator OP 48 and insert the previously measured value in km/h (maximum possible speed at full FU-activation). ▌ Go again to administrator OP 05 and indicate the desired / appropriate maximum speed. Info 1: If no speed scan (speed sensor) is set under OP11, the speed calibration value will be calculated automatically with OP48. Info 2: Even if no speed scan is set, the speed calibration value is of internal significance. In that case the scanning impulses (actual impulse) are deduced or simulated directly from the analogue voltage and not measured via the speed sensor input. Range of adjustment: 1.00 to 99.99 km/h Fixed values selectable with up- /down-key: 20; 22; 22.5; 26; 30; 30.3; 40; 40.9; 41.2; 45.3; 46; 50; 60; 80
OP49	Type of frequency inverter (FI) control	Setting of FI control. Two types are available for selection:  Analogue 0 to 10 V AnA LOG Digital via RS-485 rS- 485

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OP51	Error statistics of the digital FI control Note: At each emergency stop the number of timeout errors is increased automatically by at least one numerator because the transmission line to the FI is interrupted by hardware.	The lower display row reports the errors of three different error types. DISTANCE Number of NAK errors: (not acknowledged) The FI has not accepted the last command (transmission error, …). ELEVATION PROGRAM Number of total test errors: the test total of the received FI messages is wrong (transmission error, …). HEART RATE SEX AGE WEIGHT Number of timeout errors: the FI has not answered within the timeout period (60 ms).
OP89	System for elevation measurement (option not relevant for treadmills without elevation or ladder ergometers) Note: Normally the correct system for elevation measurement is set by selecting the correct device type (administrator option number 3). Only in very few cases and for special models is this option needed.	The following kinds of elevation measurement can be selected: 0 = no elevation available. 1 = elevation control: increment disc with light barrier 60 incr. per motor rotation or hall effect sensor with 60 incr. per motor rotation: elevation element with a 4 mm spindle for: 0 - 25% elevation (QUASAR/PULSAR from 1991 to 2001) 2 = elevation control: increment disc with light barrier 60 incr. per motor rotation or hall effect sensor with 60 incr. per motor rotation: elevation element with a 5 mm spindle for: 0 - 25% elevation (h/p/cosmos saturn since 1994) 3 = elevation control: increment disc with light barrier 60 incr. per motor rotation or hall effect sensor with 60 incr. per motor rotation: elevation element with a 5 mm spindle for: 0 - 35% elevation (h/p/cosmos venus since 1997) 4 = elevation control: linear motor for 0 - 24% elevation, increment sensor, lift range 240 mm (h/p/cosmos mercury since 1997) 5 = elevation control: linear motor for 0 - 28% elevation, increment sensor, lift range 300 mm (h/p/cosmos quasar 4.0 since 2002) 6 = elevation control: linear motor for 0 - 25% elevation, increment sensor, lift range 300 mm (h/p/cosmos pulsar 4.0 since 2002) 7 = hydraulic-cylinder for 0 - 11 % elevation angle. lift range 430 mm (series PLM Mustang 2200) 8 = hydraulic-cylinder for 0 - 11 % elevation angle. lift range 302 mm (series PLM Trainer) 9 = linear motor „HN“ + lifting arm. 0 - 25% elevation angle. lift range 252 mm (h/p/cosmos mercury since 2007) 10 = linear motor „HN“ + lifting arm. -10…+18% elevation angle. lift range 300 mm (h/p/cosmos quasar since 2007) 11 = linear motor „HN“ + lifting arm. -10…+15% elevation angle. lift range 300 mm (h/p/cosmos pulsar since 2007) 12 = increment disc with light barrier or inductive sensor 60 incr. per motor rotation: elevation element with 8mm spindle. -4…25 % elevation (h/p/cosmos saturn 450/300rs as of 2008)
OP93	Total time of operation (h) = standby time including time of use of the motor / running belt Note: It is not allowed to change the total time of operation or the total distance to a value which does not match the real value of the device.	DISTANCE and ELEVATION PROGRAM report: hours of operation HEART RATE SEX AGE WEIGHT indicates h Difference to user option 03: the displayed value can also be changed.

OP94	Total time of use (h) = time of use of motor / running belt only Note: It is not allowed to change the total time of operation or the total distance of the running machine to a value which does not match the real value of the device	DISTANCE and ELEVATION PROGRAM report: hours of operation HEART RATE SEX AGE WEIGHT reports: h Difference to user option 04: the displayed value can also be changed.
OP95	MCU serial number	Report and entering of 8-digit serial number with the following format: YYMM NNNN YY: 2-digit number of year of production lot MM: month of production lot NNNN: 4-digit serial number
OP98	Setting of limitation of usage time	Secret option
OP99	Test profile 99 for endurance testing in the factory / service	With this option a special test profile (profile number 99) for endurance testing in the factory or service can be activated. This test profile is not for normal use and must be deactivated again after using. If the device is switched off and on again, profile number 99 is deactivated automatically. Details of test profile 99: Elevation from 0 to maximum elevation every 20 min. Speed 3.0 km/h for 2 hours (for ladder ergometer: 3.0 m/min for 2 hours) Speed 5.0 km/h for 3 hours (for ladder ergometer: 5.0 m/min for 3 hours) Speed 8.0 km/h for 8 hours (for ladder ergometer: 8.0 m/min for 8 hours) Repeat after 13 hours. Adjustable settings: 0 = test profile 99 locked / de-activated 1 = test profile 99 activated

Standard settings of administrator options			
Option	Description	Standard setting	Adjustable range
OP 01	Reset of error messages E20, E21, E30, E31, E32, E41, E50 and E51		
OP 02	OEM code	depending on the model	0 = h/p/cosmos (Standard) 1 = JAEGER / VIASYS / Cardinal Health / CareFusion 2 = Ergo-Fit (1997-98) 3 = Proxomed / Kardiomed 4 = KISTLER Gaitway 6 = COSMED 9 = SCHILLER
OP 03	Selection of device type: see list of running machines types	depending on the model	depending on the model
OP 04	Maximum speed for reverse belt rotation	depending on the device type in OP03	1.0 km/h .... max. speed
OP 05	Maximum speed	depending on the device type in OP03	1.0 km/h .... max. speed
OP06	Max. acceleration time in seconds	Increment 131 = 5 sec.	Increments: 255 ... 1 Seconds: 2.6 ... 655.4
OP 07	Maximum elevation	depending on the device type in OP03	0 .... max. elevation
OP 08	Heart rate display interval	0 = beat to beat	0 or 1 ... 9 seconds
OP 09	Display test for all displays		
OP 10	Enter the serial number of the device	300…	12-digit serial number
OP 11	Activating and deactivating speed measurement	depending on the device type in OP03	0 = without speed measurement 1 = with speed measurement
OP 12	Setting of allowance for speed signal comparison (measurement / control)	6 % *This value does not reflect the speed accuracy of the running belt.*	0 = no comparison 6 = 6 % deviation allowed 8 = 8 % deviation allowed 10 = 10 % deviation allowed
OP13	Motor brake	OFF	OFF = not active ON = active
OP 14	Maximum acceleration time for RS232	Increment 41 = 16 sec	Increments: 255 ... 1 Seconds: 2.6 ... 655.4
OP 16	Activating and deactivating heart rate measurement	(depending on the model)	0 = HF measurement deactivated 1 = HF measurement activated, HFU1 + RE06REC 2 = HF measurement activated, HFUi; auto = autom. detection
OP 33	Distance between rungs (only for ladder ergometer)	254 = 25.4 cm	Distance between rungs in 0.1 cm
OP 34	Manual speed calibration	(depending on the device type, OP 03)	Range from: 0 to 65535
OP 35	Oil interval	1.000 km (treadmills) 100 km (ladder ergometer)	0 = no supervision 100 ... 5.000 km

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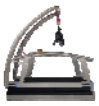
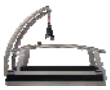
OP 37	Interval for service message TSC (time-dependent) for technical safety control E.02 "HELP"	12 months	0 = no supervision (from firware version v1.07.x on) 0 … 48 month
OP 38	Service Interval (distance-dependent) "E 02" "HELP"	5,000 km (treadmill) 500 km (ladder ergometer)	0 = no supervision (from firware version v1.07.x on) 1,000 ... 9,999 km (treadmill) 100... 5,000 km (ladder ergometer)
OP 39	Elevation: display as set point or true value	1 (true value)	0 = set point 1 = true value
OP 40	Speed: display as set point or true value	1 (true value)	0 = set point 1 = true value
OP 41	Elevation control after STOP	0 (elevation maintains)	0 = elevation maintains 1 = elevation gets down to 0 %
OP 46	Display and setting of elevation for ladder ergometer	75 (degree)	0 … 180 degree
OP 47	Reset of oil- and service interval		
OP 48	Running belt speed at maximum frequency inverter speed	depending on the device type, OP 03	(depending on the device type, OP 03) 1.00 … 99.99 km/h
OP 49	Type of FI control	RS-485	analogue, RS-485
OP 51	Error statistics of the digital FI-control	n.a.	0 to 9999 per type of error
OP 89	System for elevation measurement	(depending on the device type; OP 03)	(depending on the device type; OP 03)
OP 90	Load or save default setting	n.a.	n.a.
OP 91	Total time of operation MCU (incl. stand by)	n.a.	0 ... 1.193.046 h
OP 92	Total distance	n.a.	0 ... 4.294.976 km
OP 93	Total time of operation (incl. stand-by)	n.a.	0 ... 1.193.046 h
OP 94	Total time of use (motor + belt)	n.a.	0 ... 1.193.046 h
OP 95	MCU serial number	n.a.	0000 0000 to 9999 9999
OP 98	Setting for limitation of time of use	n.a.	n.a.
OP 99	Test profile 99 for endurance testing in the factory / service	0 = test 99 de-activated	0 = test profile 99 de-activated 1 = test profile 99 activated

10.1 List of running machines types

If you have questions regarding the correct device type, contact the h/p/cosmos service for authorization in writing before making any changes.

Model view	Model series track in cm	Device type code	Reverse speed (km/h)	Speed (km/h)	Elevation (%)	Speed sensor 0 = no, 1 = yes	Increment for 10 m	Maximum inverter speed (km/h)	Elevation system code	Max. frequency inverter (Hz)	Drive roller (shaft) diameter (mm)
		OP03	OP04	OP05	OP07	OP11	OP34	OP48	OP89		Ø
User defined		0.1									
	150 / 50	1.1	-5.0	10.0	24	1	8490	10.0	4	80.2	80
		1.2		20.0	24	0	5988	20.0	4	114.0	
		1.3		22.0	24	0	5988	22.0	4	125.0	
		1.4		30.0	24	0	4165	30.0	4	119.0	
		1.5		10.0	25	1	8490	10.0	9	80.2	
		1.6		20.0	25	0	5988	20.0	9	114.0	
		1.7		22.0	25	0	5988	22.0	9	125.0	
		1.8		30.0	25	0	4165	30.0	9	119.0	
	150 / 50	2.1		10.0	0	1	8490	10.0	0	80.2	
		2.2		20.0		0	5988	20.0	0	114.0	
		2.3		22.0		0	5988	22.0	0	125.0	
		2.4		30.0		0	4165	30.0	0	119.0	
	200 / xx	3.1	no limit	40.0	35	1	2617	40.0	3	120.0	180
		3.2		50.0		1	2617	50.0	3	125.0	
		3.3		60.0		1	2617	60.0	3	100.0	
		3.4		80.0		1	2617	80.0	3	130.0	
		3.5		60.0		1	1700	60.0	3	100.0	
		3.6		80.0		1	1700	80.0	3	130.0	
	250 / xx 300 / xx 450 / xx	4.1	no limit	40.0	25	1	2617	40.0	2	120.0	
		4.2		50.0	25	1	2617	50.0	2	125.0	
		4.3		60.0	25	1	2617	60.0	2	100.0	
		4.4		80.0	25	1	2617	80.0	2	130.0	
		4.5		40.0	27	1	2617	40.0	2	120.0	
		4.6		50.0	27	1	2617	50.0	2	125.0	
		4.7		60.0	27	1	2617	60.0	2	100.0	
		4.8		80.0	27	1	2617	80.0	2	130.0	
		4.9		60.0	27	1	1700	60.0	2	100.0	
		4.10		80.0	27	1	1700	80.0	2	130.0	
		n.a.	n.a.	40.0	25	1	1040	40.0		n.a	480
	170 / 65	5.1	-5.0	10.0	28	1	7800	10.0	5	80.2	100
		5.2		22.0	28	1	4495	22.5	5	94.5	
		5.3		25.0	28	1	4495	26.0	5	110.0	
		5.4		30.0	28	1	4010	30.3	5	115.0	
		5.5		40.0	28	1	2874	41.2	5	113.0	
		5.6		45.0	28	1	2874	45.3	5	125.0	
		5.7		10.0	25	1	7800	10.0	5	80.2	
		5.8		22.0	25	1	4495	22.5	5	94.5	
		5.9		25.0	25	1	4495	26.0	5	110.0	
		5.10		30.0	25	1	4010	30.3	5	115.0	
		5.11		40.0	25	1	2874	41.2	5	113.0	
		5.12		45.0	25	1	2874	45.3	5	125.0	
	170 / 65	6.1	-5.0	10.0	0	1	7800	10.0	0	80.2	
		6.2		22.0		1	4495	22.5	0	94.5	
		6.3		25.0		1	4495	26.0	0	110.0	
		6.4		30.0		1	4010	30.3	0	115.0	
		6.5		40.0		1	2874	41.2	0	113.0	
		6.6		45.0		1	2874	45.3	0	125.0	
	190 / 65 1p	7.1	-5.0	40.0	25	1	2874	40.9	6	113.0	
	190 / 65 3p	7.1	-5.0	40.0	25	1	2874	40.9	6	110.0	
		7.2		45.0		1	2874	46.0	6	125.0	

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11 Technical data

11.1 Running machines, 150/50 (mercury)

stratos®, mercury®, gaitway® locomotion® med	h/p/cosmos stratos h/p/cosmos stratos lt	h/p/cosmos mercury h/p/cosmos mercury lt	h/p/cosmos stratos med h/p/cosmos stratos med lt	h/p/cosmos mercury med h/p/cosmos mercury med lt	h/p/cosmos Kistler Gaitway II F [a] h/p/cosmos Kistler Gaitway II S	h/p/cosmos locomotion 150/50 E med h/p/cosmos locomotion 150/50 DE med
UserTerminal (display & keyboard)	6 LCD displays / 6 keys / display of mode and unit with LED. "lt-models" and "h/p/cosmos locomotion 150/50 E med" have no UserTerminal (no display, no keyboard). Control via interface.					E: no Terminal DE: TouchScreen
Power supply AC (standard, read nameplate), dedicated line required.	U: 100 V ~ / 110 V ~ / 200 V ~ / 208 V ~ / 230 V ~ including N and PE f: 50/60 Hz					
Fuse (standard, read nameplate)	C 16 A at 230 V ~					
Power input (long time)	1500 VA					
Power input (momentary)	3400 VA (peak performances for milliseconds; max. 1s/min during heel strike)					
Drive motor capacity	3300 VA					
Elevation motor capacity	not applicable	390 VA	not applicable	390 VA	390 VA [a] not applicable	390 VA
Safety standards	CE IEC EN 60335-1(VDE 0700) IEC EN 60601-1-2, IEC EN 60601-1-4, VDE 0701, EN 957-1, EN 957-6, Machinery Directive 2006/42/EC		CE 0123 MDD, directive 93/42/EEC + 2007/47/EC, IEC EN 60601-1 (VDE 0750), VDE 0751, IEC EN 60601-1-2, IEC EN 60601-1-4, EN 957-1, EN 957-6, Machinery Directive 2006/42/EC			
Leakage current	0.6 mA		0.2 mA			
Isolation transformer	---		2000 VA			
Degree of protection:	class I ⏚ / --- / IP 20		class I ⏚ / type B 🧍 / IP 20			
Overvoltage category	Life-Earth < 300 V transient over-voltage limit 1500 V		Category III: Life-Earth < 300 V transient over-voltage limit 4000 V			
Mode of operation	continuous operation with intermittent loading (according to IEC 60601-1)					
Field of application / accuracy	sports and fitness: S,I,A (EN957)		sports and medical: S,I,A (EN957)			
Classification according to MDD	---		active therapeutic device and active diagnostic device, risk class II b			
Speed Definition	0.0 ... 22.0 km/h 0.1 km/h					0.0 … 10.0 km/h 0.1 km/h
Speed accuracy*	+/- 5 %					
Option special speed	0.0 ... 10 km/h or 0.0... 30 km/h					0.0 ... 22.0 km/h 0.0 ... 30.0 km/h
Angle of inclination** Definition	not applicable	0.0 ... 25.0 %** 0.1 %	not applicable	0.0 ... 25.0 %** 0.1 %	not applicable	0.0 ... 25.0 %** 0.1 %

stratos®, mercury®, gaitway® locomotion® med	h/p/cosmos stratos h/p/cosmos stratos lt	h/p/cosmos mercury h/p/cosmos mercury lt	h/p/cosmos stratos med h/p/cosmos stratos med lt	h/p/cosmos mercury med h/p/cosmos mercury med lt	h/p/cosmos Kistler Gaitway II F [a] h/p/cosmos Kistler Gaitway II S	h/p/cosmos locomotion 150/50 E med h/p/cosmos locomotion 150/50 DE med
Dimension of running surface length x width	1500 x 500 mm					
Dimension frame length x width x height	2100 x 800 x 1370 mm (UserTerminal + 150 mm width)					2200 x 1000 x 1440 mm seats: + 400mm
Track access height from floor	180 mm					
Weight of device	200 kg		220 kg		350 kg	365 kg
Weight load limits to floors (traffic load to DIN 1055 part 3)	8.2 kN/m²		8.3 kN/m²		9.1 kN/m²	7.0 kN/m²
	In case of any further questions related to load limits onto floors, please ask our service department.					
Max. permissible user weight	200 kg (deviation on request specially made)					
Environmental conditions: Transport and storage	temperature: –30...+50 °C, humidity: 0...95 % - without condensation barometric pressure: 700...1060 hPa					
Environmental conditions: Operation	temperature: +10...+40 °C (deviation on request), humidity: 30...70% - without condensation (up to 95% on request), barometric pressure: 700...1060 hPa Maximum operating altitude: approx. 10,000 feet (3000m), without pressurization					
Pollution degree	Degree 2: Normally only nonconductive pollution. Temporary conductivity caused by condensation is to be expected.					
Central lubrication system	manual					
Number of stored programmes	6 training profiles / 10 test profiles / 8 user definable profiles					
RS232 Digital interface / serial port (USB-converter optional)	COM1: standard COM2: optional COM3: optional (standard for service) COM4: optional				COM1, COM2: standard COM3, COM4 n.a.	
Heart rate measurement	POLAR, 1 channel receiver, ECG precisely					POLAR W.I.N.D.
PC software (not for medical applications)	h/p/cosmos para control® included options: h/p/cosmos para graphics®, h/p/cosmos para analysis® and h/p/cosmos para motion®					
Reverse belt rotation	option					standard
Safety arch with chest belt system***	option					
Handrails	options: short / long / adjustable handrails, crossbar					adjustable
Arm support	option					not applicable
Additional keyboard	option					standard

* Overload and weak power supply (under voltage) could lead to higher discrepancies concerning the speed display or dripping of the fuse.

** The time of operation of the elevation motor (TO = 15 %) converts to approx. 5 full elevation cycles. Overload can result in temporary tripping of the fuse, but can be used again after short cool down period. Treadmills of the h/p/cosmos saturn series built approx. before January 2007 have a maximum elevation of 25 %.

*** For maximum stress tests and with oversize running machines (track sizes) a safety facility (e.g. a safety arch with chest belt system) is necessary and highly recommended. When using a front-bar handrail (crossbar), the speed is limited to 5 km/h for safety reasons. Data of weight and measurements can deviate.

Ask for further details and optional equipment or visit www.h-p-cosmos.com. Subject to technical alterations without prior notice. E & OE.

11.2 Running machines, 170-190/65 (quasar / pulsar)

stellar®, quasar®, pulsar® locomotion® 190/65 med	h/p/cosmos stellar h/p/cosmos stellar lt	h/p/cosmos quasar h/p/cosmos quasar lt	h/p/cosmos stellar med h/p/cosmos stellar med lt	h/p/cosmos quasar med h/p/cosmos quasar med lt	h/p/cosmos pulsar h/p/cosmos pulsar lt	h/p/cosmos locomotion 190/65 E med h/p/cosmos locomotion 190/65 DE med
UserTerminal (display & keyboard)	6 LCD displays / 6 keys / display of mode and unit with LED. "lt-models" have no UserTerminal (no display, no keyboard). Control via interface.					E: no Terminal DE: TouchScreen
Power supply AC (standard, read nameplate), dedicated line required.	U: 100 V ~ / 110 V ~ / 200 V ~ / 208 V ~ / 230 V ~ including N and PE f: 50/60 Hz					
Fuse (standard, read nameplate)	C 16 A at 230 V ~					
Power input (long time)	1600 VA					
Power input (momentary)	3500 VA (peak performances for milliseconds; max. 1s/min during heel strike)					
Drive motor capacity	3300 VA					
Elevation motor capacity	not applicable	500 VA	not applicable		500 VA	
Safety standards	CE IEC EN 60335-1(VDE 0700) IEC EN 60601-1-2, IEC EN 60601-1-4, VDE 0701, EN 957-1, EN 957-6, Machinery Directive 2006/42/EC		CE 0123 MDD, directive 93/42/EEC + 2007/47/EC, IEC EN 60601-1 (VDE 0750), VDE 0751, IEC EN 60601-1-2, IEC EN 60601-1-4, EN 957-1, EN 957-6, Machinery Directive 2006/42/EC			
Leakage current	0.6 mA		0.2 mA			
Isolation transformer	---		2000 VA			
Degree of protection	class I ⏚ / --- / IP 20		class I ⏚ / type B 🧍 / IP 20			
Overvoltage category	Life-Earth < 300 V transient over-voltage limit 1500 V		Category III: Life-Earth < 300 V transient over-voltage limit 4000 V			
Mode of operation	continuous operation with intermittent loading (according to IEC 60601-1)					
Field of application / accuracy	sports and fitness: S,I,A (EN957)		sports and medical: S,I,A (EN957)			
Classification according to MDD	---		active therapeutic device and active diagnostic device, risk class II b			
Speed Definition	0.0 ... 25.0 km/h 0.1 km/h				0.0 ... 40.0 km/h 0.1 km/h	0.0 ... 10.0 km/h 0.1 km/h
Speed accuracy*	+/- 5 %					
Option special speed	0.0 ... 10.0 km/h, 0.0 ... 40.0 km/h, 0.0... 45.0 km/h				0.0 ... 10.0 km/h 0.0... 45.0 km/h	0.0 ... 25.0 km/h
Angle of inclination** Definition	not applicable	0.0 ... 28.0 % 0.1 %	not applicable	0.0 ... 28.0 % 0.1 %	- 25.0 % ... + 25.0 % 0.1 %	

stellar®, quasar®, pulsar® locomotion® 190/65 med	h/p/cosmos stellar h/p/cosmos stellar lt	h/p/cosmos quasar h/p/cosmos quasar lt	h/p/cosmos stellar med h/p/cosmos stellar med lt	h/p/cosmos quasar med h/p/cosmos quasar med lt	h/p/cosmos pulsar h/p/cosmos pulsar lt	h/p/cosmos locomotion 190/65 E med h/p/cosmos locomotion 190/65 DE med
Dimension of running surface length x width	1700 x 650 mm				1900 x 650 mm	
Dimension frame length x width x height	2300 x 1050 x 1450 mm (UserTerminal + 150 mm width)				2500 x1050 x 1450 mm UT: + 150 mm	2500 x1150 x 1450 mm seats: + 400 mm
Track access height from floor	230 mm					
Weight of device	310 kg	315 kg	330 kg	335 kg	345 kg	560 kg
Weight load limits to floors (traffic load to DIN 1055 part 3)	6.2 kN/m²				5.8 kN/m²	6.0 kN/m²
	In case of any further questions related to load limits onto floors, please ask our service department.					
Max. permissible user weight	200 kg (deviation on request specially made)					
Environmental conditions: Transport and storage	temperature: –30...+50 °C, humidity: 0...95 % - without condensation barometric pressure: 700...1060 hPa					
Environmental conditions: Operation	temperature: +10...+40 °C (deviation on request), humidity: 30...70% - without condensation (up to 95% on request), barometric pressure: 700...1060 hPa Maximum operating altitude: approx. 10,000 feet (3000m), without pressurization					
Pollution degree	Degree 2: Normally only nonconductive pollution. Temporary conductivity caused by condensation is to be expected.					
Central lubrication system	manual					
Number of stored programmes	6 training profiles / 10 test profiles / 8 user definable profiles					
RS232 Digital interface / serial port (USB-converter optional)	COM1: standard COM2: optional COM3: optional (standard for service) COM4: optional				COM1&2: standard COM3: optional (for service) COM4: n.a. (W.I.N.D.)	COM1, COM2: standard COM3: n.a (Touchscreen) COM4: n.a. (W.I.N.D.)
Heart rate measurement and heart rate dependent endurance control	POLAR, 1 channel receiver, ECG precisely				Polar W.I.N.D. with WearLink transmission range approx. 10 m	
PC software	h/p/cosmos para control® included options: h/p/cosmos para graphics® and h/p/cosmos para analysis®				incl. para control® & para graphics® optional: para analysis®	incl. para control® optional: para graphics® & para analysis®
Reverse belt rotation	option				standard	
Safety Arch with chest belt system***	option					
Handrails	options: short, long, crossbar (standard)					adjustable
Arm support	option					n.a
Additional keyboard	option					standard

* Overload and weak power supply (under voltage) could lead to higher discrepancies concerning the speed display or dripping of the fuse.

** The time of operation of the elevation motor (TO = 15 %) converts to approx. 5 full elevation cycles. Overload can result in temporary tripping of the fuse, but can be used again after short cool down period. Treadmills of the h/p/cosmos saturn series built approx. before January 2007 have a maximum elevation of 25 %.

*** For maximum stress tests and with oversize running machines (track sizes) a safety facility (e.g. a safety arch with chest belt system) is necessary and highly recommended. When using a front-bar handrail (crossbar), the speed is limited to 5 km/h for safety reasons. Data of weight and measurements can deviate.

Ask for further details and optional equipment or visit www.h-p-cosmos.com. Subject to technical alterations without prior notice. E & OE.

11.3 Running machines, 190/65 (pulsar 3p)

pulsar® 3p Locomotion® 190/65 3p med	h/p/cosmos pulsar 3p h/p/cosmos pulsar 3p lt	h/p/cosmos locomotion 190/65-3p E med h/p/cosmos locomotion 190/65-3p DE med
UserTerminal (display & keyboard)	6 LCD displays / 6 keys / display of mode and unit with LED. "lt-models" and "3p E med" have no UserTerminal (no display, no keyboard). Control via interface.	E: no Terminal DE: UserTerminal TouchScreen
Power supply AC (standard, read nameplate), dedicated line required.	200 V 3N~ / 208 V 3N~ / 400 V 3N~ with PE f: 50/60 Hz	
Fuse (standard, read nameplate)	3 x C 16 A at 400 V 3N~	
Power input (long time)	2700 VA	
Power input (momentary)	5700 VA (peak performances for milliseconds; max. 1s/min during heel strike)	
Drive motor capacity	4300 VA	
Elevation motor capacity	500 VA	
Safety standards	CE 0123 MDD, directive 93/42/EEC + 2007/47/EC, IEC EN 60601-1 (VDE 0750), VDE 0751, IEC EN 60601-1-2, IEC EN 60601-1-4, EN 957-1, EN 957-6, Machinery Directive 2006/42/EC,	
Leakage current	0.25 mA	
Isolation transformer	3 x 1500 VA	
Degree of protection	class I ⏚ / type B 🧍 / IP 20	
Overvoltage category	Category III: Life-Earth < 300 Volt = transient over-voltage limit 4000 Volt	
Mode of operation	continuous operation with intermittent loading (according to IEC 60601-1)	
Field of application / accuracy	sports and medical: S,I,A (EN957)	
Classification according to MDD	active therapeutic device and active diagnostic device, risk class II b	
Speed Definition	0.0 ... 40.0 km/h 0.1 km/h	0.0 ... 10.0 km/h 0.1 km/h
Speed accuracy*	+/- 5 % (class A based on EN 957)	
Option special speed	0.0 ... 10.0 km/h or 0.0... 45.0 km/h	0.0 ... 25.0 km/h
Angle of inclination** Definition	- 25.0 % ... + 25.0 % 0.1 %	

pulsar® 3p locomotion® 190/65 3p med	h/p/cosmos pulsar 3p h/p/cosmos pulsar 3p lt	h/p/cosmos locomotion 190/65-3p E med h/p/cosmos locomotion 190/65-3p DE med
Dimension of running surface length x width	1900 x 650 mm	
Dimension frame length x width x height	2500 x1050 x 1450 mm (UserTerminal + 150 mm width)	2500 x1150 x 1450 mm (seats + 400 mm width)
Track access height from floor	230 mm	
Weight of device	385 kg	600 kg
Weight load limits to floors (traffic load to DIN 1055 part 3)	5.9 kN/m²	6.1 kN/m²
	In case of any further questions related to load limits onto floors, please ask our service department.	
Max. permissible user weight	200 kg (deviation on request specially made)	
Environmental conditions: Transport and storage	temperature: –30...+50 °C, humidity: 0...95 % - without condensation barometric pressure: 700...1060 hPa	
Environmental conditions: Operation	temperature: +10...+40 °C (deviation on request), humidity: 30...70% - without condensation (up to 95% on request), barometric pressure: 700...1060hPa Maximum operating altitude: approx. 10,000 feet (3000m), without pressurization	
Pollution degree	Degree 2: Normally only nonconductive pollution. Temporary conductivity caused by condensation is to be expected.	
Central lubrication system	manual	
Number of stored programmes	6 training profiles / 10 test profiles / 8 user definable profiles	
RS232 Digital interface / serial port (USB-converter optional)	COM1 and COM2: standard COM3: optional (standard for service) COM4: n.a. (used for POLAR W.I.N.D.)	COM1 and COM2: standard COM3: n.a. (used for UserTerminal TouchScreen) COM4: n.a. (used for POLAR W.I.N.D.)
Heart rate measurement and heart rate dependent endurance control	POLAR W.I.N.D. with WearLink transmission range approx. 10 m	
PC software	h/p/cosmos para control® and h/p/cosmos para graphics® included	
Reverse belt rotation / downhill	standard	
Safety Arch with chest belt system***	option	
Handrails	options: short, long, crossbar (standard)	as standard: adjustable with gas spring support
Arm support / additional keyboard	option	no arm support; additional keyboard is standard

* Overload and weak power supply (under voltage) could lead to higher discrepancies concerning the speed display or dripping of the fuse.

** The time of operation of the elevation motor (TO = 15 %) converts to approx. 5 full elevation cycles. Overload can result in temporary tripping of the fuse, but can be used again after short cool down period. Treadmills of the h/p/cosmos saturn series built approx. before January 2007 have a maximum elevation of 25 %.

*** For maximum stress tests and with oversize running machines (track sizes) a safety facility (e.g. a safety arch with chest belt system) is necessary and highly recommended. When using a front-bar handrail (crossbar), the speed is limited to 5 km/h for safety reasons. Data of weight and measurements can deviate.

Ask for further details and optional equipment or visit www.h-p-cosmos.com. Subject to technical alterations without prior notice. E & OE.

11.4 Running machines, oversize 200-450/75-300 (venus / saturn)

	h/p/cosmos venus 200/75 h/p/cosmos venus 200/75 r	h/p/cosmos venus 200/100 h/p/cosmos venus 200/100 r	h/p/cosmos saturn 250/75 h/p/cosmos saturn 250/75 r	h/p/cosmos saturn 250/100 h/p/cosmos saturn 250/100 r	h/p/cosmos saturn 250/125 r	h/p/cosmos saturn 300/75 h/p/cosmos saturn 300/75 r	h/p/cosmos saturn 300/100 h/p/cosmos saturn 300/100 r	h/p/cosmos saturn 300/125 r	h/p/cosmos saturn 450/300 rs
External control unit / UserTerminal (display & keyboard)	External control unit with TouchScreen								
Power supply AC (standard, read nameplate), dedicated line required.	200 V 3N~ / 208 V 3N~ / 400 V 3N~ with N and PE (peak performances for milliseconds; max. 1s/min during heel strike)								
Fuse (standard, read nameplate)	3 x C 32 A at 400 V 3N~								3 x 63 A 3 x 40 A 1 x 16 A
Power input (long time)	7500 VA								41500 VA
Power input (momentary)	15200 VA								66500 VA
Drive motor capacity	11000 VA								30000 VA
Elevation motor capacity	370 VA								18000 VA
Safety standards	CE 0123 MDD, directive 93/42/EEC + 2007/47/EC, IEC EN 60601-1 (VDE 0750), IEC EN 60601-1-2, IEC EN 60601-1-4 VDE 0751, EN 957-1, EN 957-6, Machinery Directive 2006/42/EC								
Leakage current	0.25 mA								on request
Isolation transformer	3 x 3000 VA								3 x 21000 VA
Degree of protection	class I ⏚ / type B 🚶 / IP 20								
Overvoltage category	Category III: Life-Earth < 300 Volt = transient over-voltage limit 4000 Volt								
Mode of operation	continuous operation with intermittent loading (according to IEC 60601-1)								
Field of application / accuracy according to EN 957	sports and medical / S,I,A (EN957) [r] = suitable for bicycle and wheelchair application (from running surface 3000 x 1250 mm standard)								
Classification according to MDD	active therapeutic device and active diagnostic device, risk class II b								
Speed / definition	0.0 ... 40.0 km/h / 0.1 km/h 0.0 ... 11.11 m/s / 0.1 m/s								
Speed accuracy*	+/- 5 % (class A based on EN 957)								
Option special speed	0.0 ... 30.0 or ... 50.0 or ... 60.0 or ... 80.0 km/h on request higher speed versions than 40 km/h only for sports models								
Angle of inclination** Definition	-35 % ... +35 % 0.1 %		-27 % ... +27%** 0.1 %						-5 % (-25 %) ... +25 %

	h/p/cosmos venus 200/75 h/p/cosmos venus 200/75 r	h/p/cosmos venus 200/100 h/p/cosmos venus 200/100 r	h/p/cosmos saturn 250/75 h/p/cosmos saturn 250/75 r	h/p/cosmos saturn 250/100 h/p/cosmos saturn 250/100 r	h/p/cosmos saturn 250/125 r	h/p/cosmos saturn 300/75 h/p/cosmos saturn 300/75 r	h/p/cosmos saturn 300/100 h/p/cosmos saturn 300/100 r	h/p/cosmos saturn 300/125 r	h/p/cosmos saturn 450/300 rs
Dimension of running surface length x width in mm	2000 x 750	2000 x 1000	2500 x 750	2500 x 1000	2500 x 1250	3000 x 750	3000 x 1000	3000 x 1250	4500 x 3000
Dimension frame length x width x height	2400 x 1150 x 1380	2400 x 1400 x 1380	2900 x 1150 x 1380	2900 x 1400 x 1380	2900 x 1650 x 1380	3400 x 1150 x 1380	3400 x 1400 x 1380	3400 x 1650 x 1380	on request dep. on install.
Track access height from floor (optional installation in pit)	480 mm								on request dep. on install.
Weight of device	850 kg	900 kg	950 kg	1000 kg	1050 kg	1100 kg	1150 kg	1250 kg	on request dep. on install.
Weight load limits to floors (traffic load to DIN 1055 part 3)	9.0 kN/m²	7.5 kN/m²	7.7 kN/m²	6.5 kN/m²	5.6 kN/m²	7.0 kN/m²	5.8 kN/m²	5.1 kN/m²	on request
	In case of any further questions related to load limits onto floors, please ask our service department.								
Max. permissible user weight on running surface	280 kg (deviation on request specially made)								
Environmental conditions: Transport and storage	temperature: –30...+50 °C, humidity: 0...95 % - without condensation barometric pressure: 700...1060 hPa								
Environmental conditions: Operation	temperature: +10...+40 °C (deviation on request), humidity: 30...70% - without condensation (up to 95% on request), barometric pressure: 700...1060 hPa Maximum operating altitude: approx. 10,000 feet (3000m), without pressurization								
Pollution degree	Degree 2: Normally only nonconductive pollution. Temporary conductivity caused by condensation is to be expected.								
Central lubrication system	manual / running machines with [r] have automatic central lubrication system								
Number of stored programmes	6 training profiles / 10 test profiles / 8 user defined profiles								
RS232 Digital interface / serial port	COM1: standard; COM2: standard; COM3: n/a (standard for service); COM4: n/a								
Heart rate measurement and heart rate dependent endurance control (target pulse programming)	POLAR W.I.N.D. with WearLink coded transmission transmission range approx. 10 m								
PC software (not for medical application)	h/p/cosmos para control® and h/p/cosmos para graphics® included option: h/p/cosmos para analysis®, h/p/cosmos para motion®								
Reverse belt rotation / downhill	standard								
Safety arch with chest belt system***	obligatory option (or alternative fall stop preventive system)								
Wheelchair stabilizer	option								
Notebook holder and laptop computer	option								
Additional keyboard	option								
Additional emergency button	standard								
Science port for raw data of speed signal	option								

* Overload and weak power supply (under voltage) could lead to higher discrepancies concerning the speed display or dripping of the fuse.

** The time of operation of the elevation motor (TO = 15 %) converts to approx. 5 full elevation cycles. Overload can result in temporary tripping of the fuse, but can be used again after short cool down period. Treadmills of the h/p/cosmos saturn® series built approx. before January 2007 have a maximum elevation of 25 %.

*** For maximum stress tests and with oversize running machines (track sizes) a safety facility (e.g. a safety arch with chest belt system) is necessary and highly recommended. When using a front-bar handrail (crossbar), the speed is limited to 5 km/h for safety reasons. Data of weight and measurements can deviate.

Ask for further details and optional equipment or visit www.h-p-cosmos.com. Subject to technical alterations without prior notice. E & OE.

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11.5 Electromagnetic compatibility (EMC) and immunity: Guidance and manufacturer's declaration

Guidance and manufacturer's declaration - electromagnetic emissions (for all equipment and systems)		
The running machine is intended for use in the electromagnetic environment specified below. The customer or the user of the running machine should assure that it is used in such an environment.		
Emissions test	Compliance	Electromagnetic environment — guidance
RF emissions CISPR11	Group 1 Class B	The running machine uses RF energy only for its internal function. Therefore, its RF emissions are low and are not very likely to cause any interference in nearby electronic equipment.
RF emissions CISPR11	Group 1 Class B	The running machine is suitable for use in all establishments including domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity (for all equipment and systems)			
The running machine is intended for use in the electromagnetic environment specified below. The customer or the user of the running machine should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % U_T (>95 % dip in U_T) for 0.5 cycle	<5 % U_T (>95 % dip in U_T) for 0.5 cycle	Mains power quality should be that of a typical commercial or hospital environment. If the user of the running machine requires continued operation during power mains interruptions, it is recommended that the running machine be powered from an uninterruptible power supply or a battery. Caution! Running machines require high capacity UPS because of high capacity motor drive.
	40 % U_T (60 % dip in U_T) for 5 cycles	40 % U_T (60 % dip in U_T) for 5 cycles	
	70 % U_T (30 % dip in U_T) for 25 cycles	70 % U_T (30 % dip in U_T) for 25 cycles	
	<5 % U_T (>95 % dip in U_T) for 5 sec	<5 % U_T (>95 % dip in U_T) for 5 sec	
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	Not applicable	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE U_T is the A.C. mains voltage prior to application of the test level.			

EMC certification bodies: Mitsubishi Electric Europe / EMC-Laboratory, Mündelheimer Weg 35, DE 40472 Düsseldorf / Germany
EMV Testhaus GmbH, Gustav - Hertz - Strasse 35, DE 94315 Straubing / Germany, J. Schmitz GmbH, DE 83022 Rosenheim / Germany
Strong electromagnetic fields, transmitters and interferences which are above the normal tolerance, can interfere with measuring functions and displays of the running machines and can lead to other malfunctions.
Please pay special attention also to the other EMC related chapters of this manual:
Chapters: Safety, installation, operation, POLAR heart rate monitor, troubleshooting.

Guidance and manufacturer's declaration -electromagnetic immunity (for all equipment and systems that are not life supporting)			
The running machine is intended for use in the electromagnetic environment specified below. The customer or the user of the running machine should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment — guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the running machine, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance:
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	$d = 1.17 \quad 1/V * \sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	$d = 1.17 \quad m/V * \sqrt{P}$ for 80 MHz to 800 MHz $d = 2.33 \quad m/V * \sqrt{P}$ for 800 MHz to 2.5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey. [a] should be less than the compliance level in each frequency range. [b] Interference may occur in the vicinity of equipment marked with the following symbol:
NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered, If the measured field strength in the location in which the running machine is used exceeds the applicable RF compliance level above, the running machine should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the running machine.			
[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

Recommended separation distances between portable and mobile RF communications equipment and the running machine (for all equipment and systems that are not life supporting)			
The running machine is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the running machine can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the running machine as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter (in Watt)	Separation distance (in meters) according to frequency of transmitter		
	150 kHz to 80 MHz $d = 1.17 \quad 1/V * \sqrt{P}$	80 MHz to 800 MHz $d = 1.17 \quad m/V * \sqrt{P}$	800 MHz to 2.5 GHz $d = 2.33 \quad m/V * \sqrt{P}$
0.01 W	0.12 m	0.12 m	0.23 m
0.1 W	0.37 m	0.37 m	0.74 m
1 W	1.17 m	1.17 m	2.33 m
10 W	3.70 m	3.70 m	7.37 m
100 W	11.7 m	11.7 m	23.3 m
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

11.6 Compatible devices

Products for application in combination with h/p/cosmos treadmills:
h/p/cosmos offers the treadmill in combination with components with which the system can be used (components from h/p/cosmos as well as from other manufacturers).
The clinical evaluation refers only to the h/p/cosmos treadmills and the "intersection risks" (e.g. risk during stress test until fatigue in treadmill ergometry with cardiorespiratory diagnostic) and does not refer to the optional components themselves.
The products in the following table are listed according to article 12 of the MDD 93/42/EEC.

Medical Product	Manufacturer	Intended Use	CE class	Configuration
ergospirometry systems CareFusion (VIASYS / JAEGER) Oxycon mobile CPX	CareFusion 234 GmbH Höchberg, Germany	ergo-spirometry	IIa CE0123	via coscom v3 interface, released for complete medical treadmill series
ergospirometry system COSMED K4 b² / Quark b²	COSMED s.r.l Rome / Italy	ergo-spirometry	IIa CE0476	via coscom v3 interface, released for complete medical treadmill series
ergospirometry system CORTEX	CORTEX Biophysik GmbH Leipzig, Germany	ergo-spirometry	IIa CE0124	via coscom v3 interface, released for complete medical treadmill series
ergospirometry system Geratherm BlueCherry	Geratherm GmbH, Germany	ergo-spirometry	IIa CE0118	via coscom v3 interface, released for complete medical treadmill series
SCHILLER CS 200 Excellence	SCHILLER AG Baar, Switzerland	ECG stress testing	IIa CE0123	via coscom v3 interface, released for complete medical treadmill series
POLAR Heart Rate Monitor Type T31, T34 and W.I.N.D with WearLink	POLAR Electro OY Oulu, Finland sales through: h/p/cosmos sports & medical gmbh	stress testing and cardiac rehabilitation	IIa CE0537	wireless transmission, T31, T34 released for all h/p/cosmos treadmills of 150/50 series (except locomotion) and 170/65 series W.I.N.D. system released for all locomotion, pulsar, venus and saturn models
Pneumex Unweighting System BWS Body Weight Support System PneuWeight (airwalk) 70 PneuWeight (airwalk) 160	Pneumex, Inc. Sandpoint / USA. placed on EC market: EUROLINK Ltd./Martin Green Swindon / UK sales through: h/p/cosmos sports & medical gmbh	orthopaedic and neurologic rehabilitation	I CE	no physical contact to h/p/cosmos treadmill, just used "over" the treadmill. released for all h/p/cosmos treadmills with running deck size 150/50 cm and 170…190/65 cm

All other systems and devices which are not in the above stated list must not be connected to h/p/cosmos running machines. Please contact service@h-p-cosmos.com for the latest updated list of compatible devices and systems in writing. Only connect and/or use accessories, software and host equipment if it is approved as compatible by all manufacturers. Noncompliance with this clause can lead to serious injury or death. Furthermore, manufacturer warranty and liability expires.
Pay attention to all operating instructions, safety notes, warnings and precautions in this manual. Pay special attention to all instructions for operation, maintenance and service in all accessories and/or software manuals.
Accessory equipment connected to the analogue and digital interfaces must be certified according to the respective IEC standards, e.g. IEC 950, IEC 60601-1, IEC 60601-1-1.
Everybody who connects additional equipment to the signal input port or signal output port or via any other linkage possibility, and/or when putting a company sign/logo/mark on a medical device, configures a medical system, thereby becoming the manufacturer of this new device/system and is therefore responsible that the system complies with the requirements of IEC 60601-1-1.

Please pay special attention also to article 12 of Medical Device Directive 93/42/EEC:
If the equipment is used in the field of medicine, all connected devices and host equipment must be linked with potential equalization cables. First connect the potential equalization cable with the corresponding potential equalization plug pin (next to the main switch on the front of the h/p/cosmos device), then connect the entire medical system to the main potential equalization terminal of the medical room and then connect the mains voltage power plug of the medical system.

More recent computers will have only an USB interface instead of the RS232 interface.
In that case an „USB to RS232 interface adapter cable" is available at h/p/cosmos under item no. [cos12769].
To control via USB interface, a processor Pentium 1.8 GHz or higher is required.

11.7 Interface protocols

h/p/cosmos has only approved the interface protocol "coscom v3" for medical applications according to MDD / directive 2007/47/EC, EN 62304, EN 14971, mandatory since March 21, 2010.

All other interface protocols (older versions coscom v2, coscom v1, coscomekg.dll, protocols of other treadmill manufacturers, etc.) are no longer validated by h/p/cosmos according to the norms EN 62304 and EN 14971 and must not be used for medical applications (e.g. ergometry, stress-tests, cardiorespiratory diagnostic, performance diagnostic, etc.) since March 21, 2010 in connection with h/p/cosmos treadmills or h/p/cosmos OEM treadmills, except where explicitly approved and confirmed in writing by h/p/cosmos and the respective manufacturer!
The support for all older coscom® files (including coscomekg.dll version 1.00 and coscom.dll version 1.2.9 and also including coscom v2) ended on 31 December 2010. Please upgrade to the new coscom v3 .NET Objects and coscom v3 .NET Controls.
Please note also that the older versions of coscom v1 and coscom v2 are not designed and not documented based on IEC EN 62304:2006 medical device software - software life cycle processes. Therefore since March 21, 2010 it has been obligatory to upgrade to h/p/cosmos coscom v3 in order to stay compatible with the latest norms, latest safety standards and regulatory issues when connecting to h/p/cosmos medical treadmills.
We strongly recommend updating to the latest h/p/cosmos coscom v3 interface protocol. The latest coscom.dll and implementation notes can be found on www.coscom.org. In case you have any questions please contact service@h-p-cosmos.com

11.8 Economic life time

The economic life time of the product is considered to be 20 years with normal usage and application, provided that after 10 years all electrical parts and components are renewed (if damaged or extremely heavily used possibly earlier) and the recommended maintenance intervals are kept. Every maintenance and repair work is to be carried out by authorized h/p/cosmos technicians. A shorter life time may be expected for wear and tear parts.

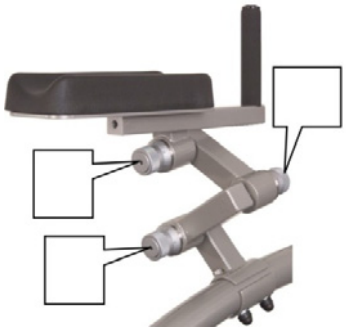
12 Accessories and options

The following chapters describe the accessories and options available at h/p/cosmos.

⚠	Only connect and/or use accessories, software and host equipment if it is approved as compatible by all manufacturers. Non-compliance with this clause can lead to serious injury or death. Furthermore, manufacturer warranty and liability expires. Pay attention to further safety regulations and operation instructions in the appendix of this instruction manual. Pay special attention to all instructions for operation, maintenance and service in all accessory and/or software manuals. Chest harnesses, patient vests, waist belts with leash and cuffs, leg cuffs and forearm overlays (“arm rests”) are not designed for direct skin or mucous membrane contact. Wear appropriate clothing.

12.1 Arm support

The h/p/cosmos arm supports (patent no.: DE 199 16 508 A1) are applicable especially in the field of rehabilitation and walking therapy, as well as for the safety of seniors and insecure persons. Therapies can start earlier and the therapist is supported efficiently in his work.
The arm supports with additional keyboard and additional stop button offers a wide range of applications, e.g. exercising in gentle way for patients/people with over-weight, orthopaedic problems or cardiovascular diseases.



h/p/cosmos arm support [cos00098060044] for handrails with 10° angle
h/p/cosmos arm support [cos12013] for handrails with 0° angle (for example long handrails with 2 pillars
available for h/p/cosmos running machines model series

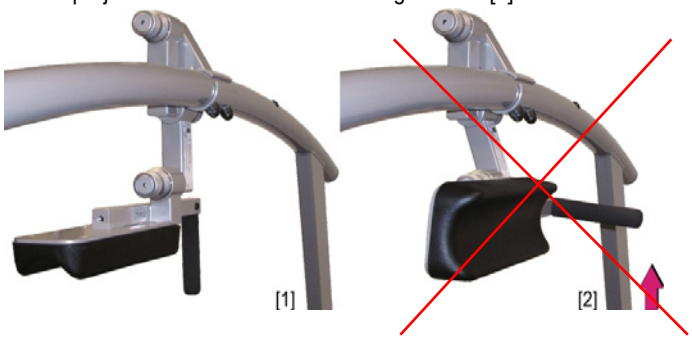
- h/p/cosmos mercury®
- h/p/cosmos quasar®
- h/p/cosmos pulsar® with long and standard handrails

Reproducibility of adjustments

The arm supports can be precisely adjusted to the needs and physical demands of the patient. Three joints with scale on each side offer individual adjustments.
To obtain reproducibility, the individually optimal adjustments have to be determined (see scaling at the locking elements) for each subject and noted appropriately (e.g. in a patient file). We have deliberately refrained from offering standard settings for particular heights because the adjustment can widely differ according to the posture and the individual situation of the testing person.
The torsional elements have a scaling at any joint, which is afferent when turned in the direction of the running surface. The adjustments of the height and width occur gradually because the interlocking of the joints works in 6° steps. In the illustration above, which can be copied, e.g. for patient files, you can fill in the scaling data for the individual adjustments of a patient.

Danger, precaution and operation of the adjustable arm supports

- The maximum load is limited to persons not more than 140 kg (309 lbs) body weight.
- Do not adjust the arm supports under strain (the upholstered arm support must not be weighted by a person)!
- Only use the arm supports under supervision of a trained staff member.
- Only trained staff is allowed to adjust the arm supports.
- Only loosen the gear tooth locking elements to adjust the angle while holding the arm supports with one hand at the handle or at the upholstered underarm support. Turn the respective lever with the hand that holds the handle to the desired position.
- Before weighting, make sure that after the adjustment, the gear tooth locking elements are correctly engaged.
- While adjusting, make sure that neither you nor any other person gets caught or squeezed into tight spots.
- Take care that the forearm overlay at the left and right arm supports are approximately horizontal and evenly adjusted.
- Do not use the arm supports with reverse belt rotation.
- For safety reasons, the use of the arm supports is only admitted for walking and not for running.
- While running, the arm supports have to be folded vertically downwards on the outside [1]. The arm supports must never project into the area of the running surface [2].



12.2 Additional keyboard and additional stop button for arm support and remote control

To complement the arm supports and to increase safety, an additional keyboard has been developed. With this keyboard, it is possible to control speed and elevation from a supported and safe position at the arm supports. The additional emergency stop button is accessible with the thumb at any time.
The additional keyboard can also be taken off its mount on the arm support and can be fixed on the handrail or next to the motor cover left or right with the help of additional mountings. With the long connection cable the therapist has the possibility to control the running machine, e.g. from a kneeling position during locomotion therapy.

h/p/cosmos additional keyboard with 6 keys incl. 2 m spiral cord	cos10106
mount for additional keyboard on arm support	cos10111
h/p/cosmos additional stop button (red button on top of handgrip) for arm support right	cos10107
h/p/cosmos additional stop button (red button on top of handgrip) for arm support left	cos10108
mount for additional stop button on handrail with clamp for circular tube 60mm	cos14135
mount for additional keyboard on motor cover left	cos14327
mount for additional keyboard on motor cover right	cos11750
extension spiral cord 2m for additional keyboard	cos12922

12.3 Special handrails

h/p/cosmos offers a number of optional handrails and custom-made devices on request. Details and order numbers are available at the manufacturer h/p/cosmos or at your local authorized distributor.

Handrail crossbar adjustable [cos12609]

Handrail crossbar bended with clamp fixation [cos15133-02]

Handrail shortened at left side “speed-grip” left [cos14763-01]

Handrail short [cos11456]

Handrail long rolled, 2 pillars[cos10166]

Handrail detachable / separable [cos14192ral9007]

Please quote the serial number of your treadmill for detailed article order number and price of the accessories since several different versions for different sizes may be available.

- The crossbar always needs to be positioned in such a way that at least 2/3 of the running surface behind the crossbar is free for the user.
- It is not allowed to run with the back to the crossbar.
- The handrail crossbar should be dismounted if a safety arch with chest belt system is installed and used.
- There must be a gap of at least 4 cm between the crossbar and the UserTerminal due to danger of bruising.

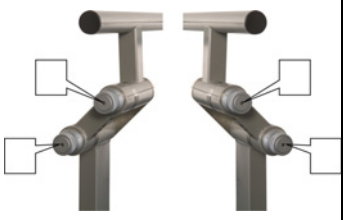
12.4 Handrails, adjustable with gear tooth locking elements

The adjustable handrails are useful for frail, elderly people and especially for all therapies and exercise with children. They offer best possible safety at best attainable freedom of body motion. The handrails are to be adjusted individually at the two joints with scales at the back end. The two stabilising elements at the front are responsible for the fixation of the adjusted position. Because of the tremendous variability and broad adjustments, the handrails are applicable for most body heights.

If using adjustable handrails, the UserTerminal is placed at the crossbar in front of the testing person.

Adjustment with scales (at the back)

Stabilising elements (at the front)



h/p/cosmos adjustable handrails [cos10030]
only available for the running machines with running surface 150/50cm (e.g. h/p/cosmos mercury® med)

Reproducibility of adjustments

To obtain reproducibility, the individually optimal adjustments have to be determined for each subject (see scaling at the locking elements at the back) and noted accordingly (e.g. in a patient file). We have deliberately refrained from offering standard settings for particular heights because the adjustments can widely differ according to the posture and the individual situation of the testing person.
The torsional elements have a scaling at any joint, which is afferent when turned in the direction of the running surface. The adjustments of the height and width occur gradually because the interlocking of the joints works in 6”-steps. You can copy the picture for patient’s files and fill in the scaling data for the individual adjustments.

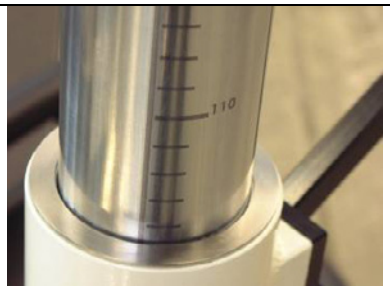
Danger, precaution and operation

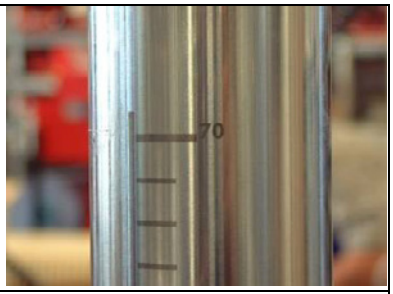
- The maximum load is limited to persons with not more than 140 kg (309 lbs) body weight.
- Do not adjust the handrails under strain, e.g. when someone is leaning on the handrails.
- Only use the adjustable handrails under supervision of a trained staff member. Only trained staff is allowed to adjust the handrails.
- Only loosen the gear tooth locking elements to adjust the angle while holding the handrail with one hand. Turn the respective lever with the hand that holds the handle to the desired position.
- Before weighting, make sure that after the adjustment the gear tooth locking elements at the rear end are correctly engaged and that the two stabilization elements at the front (“clamping screws”) are tightened and secured again.
- While adjusting, make sure that neither you nor any other person gets caught in a pinch point or capture zone.
- The h/p/cosmos arm support cannot be used with the adjustable handrails.

12.5 Handrails, adjustable: Parallel bars with gas struts and locking lever

The individually adjustable handrails offer utmost safety at best possible freedom of movement. Well suited for therapy with insecure and elderly patients as well as for therapy with children.

The picture shows
h/p/cosmos locomotion® 150/50 DE med
in locomotion application and in combination with "h/p/cosmos airwalk® se 135" unweighting system, seats for the therapist and a wheelchair ramp.





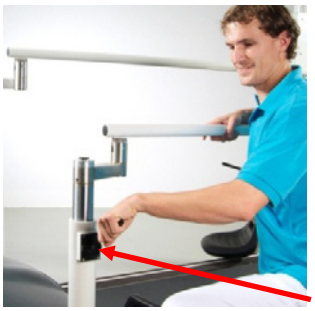
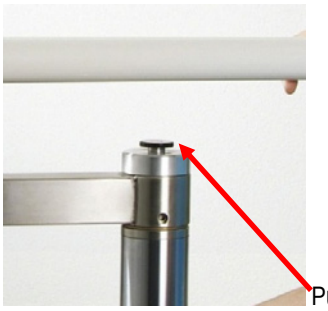
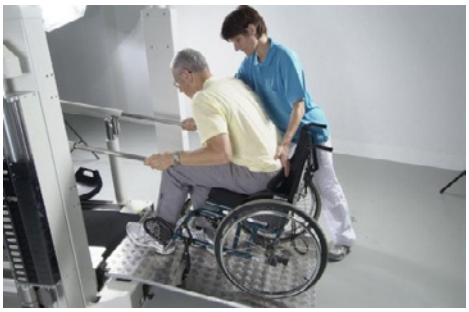
h/p/cosmos adjustable handrails for locomotion series
Available for the h/p/cosmos running machine of the "locomotion series" exclusively.

Reproducibility of adjustments

To obtain reproducibility, the individually optimal adjustments for each subject must be determined (see scaling at the gas pressure cylinders) and noted accordingly (e.g. in a patient file). We have deliberately refrained from offering standard settings for particular heights because the adjustment can widely differ according to the posture and the individual situation of the testing person.

Safety precautions and operation

- The max. load is limited to 200 kg (440 lbs) body weight.
- The positioning of the adjustable bar handrails must not be executed under load or pressure on the handrail.
- The adjustment and use of the adjustable bar handrails is reserved for trained and experienced personnel, and should always be done under supervision.
- Always lock the locking levers before using the bar handrails.
- At least once per year check the functioning of the bar handrails by exposing the bar handrail to a load of approx. 200 kg (e.g. 3 persons) with locked levers.
- While adjusting the handrails, take care that neither you nor others get caught or trapped in tight spaces.
- If turning the UserTerminal to the outside position (only allowed if the design is dedicated for this feature!), at least one emergency stop button has to remain in reach of the subject.
- The use of the h/p/cosmos arm support is not possible with the adjustable bar handrails.

Adjustment of the bar handrails		
Step	Illustration	Action
[01]	 Locking lever	Release the locking lever at the handrail by lifting up the lever
[02]	 Push button	Adjust the bar handrail to the desired height by pressing the push button.
[03]		Move the bars horizontally to adjust the required width.
[04]		Lock the locking lever by pushing it down.
[05]		▪ At the rear end of the parallel bars, two telescope tubes are mounted inside the tubes of the handrails. They can serve the subject when mounting the running surface with a wheelchair. ▪ After entering the running surface, the telescope handrails have to be inserted back to the handrail tubes to avoid any obstacles and risks of injury for the therapist moving around the running machine.

12.6 Therapist's seat and foot support, adjustable

The bilaterally positioned and ergonomically formed therapist's seats in combination with the adjustable foot supports provide the therapist with a back-friendly seating possibility while performing treadmill therapy on a patient. The adjustable therapist's seat and foot supports are fixed to the treadmill via a guide rail.

therapist's seat [cos15932-01ral9007]	foot support [cos16202-01]

Safety precautions and operation

- The max. load is limited to 200 kg (440 lbs) body weight.
- The adjustment and use of the adjustable seat and foot support is reserved for trained and experienced personnel, resp. should always be done under supervision.
- If the clamp handles are not locked sufficiently, there is danger of squeezing due to unintentional movement of the therapist's seat or the foot support. Open and overhanging clamp handles are a source of danger as well. Therefore pay attention to always lock the fixation screws before using the seat and foot support.
- Especially during adjusting, take care that neither you nor others get caught or trapped at the danger zones (jamming or squeezing zones). Special attention is required at the following danger zones: push button at extreme tangential deviation of the handrail; moveable holder of the UserTerminal to the motor hood and to the pillars of the handrails; joint heads of the handrails, moveable foot support and therapist's seat to the main frame and to the pillars of the handrails.

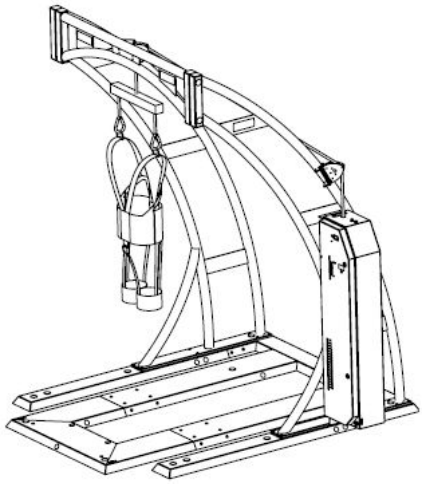
Operation and adjustment		
Step	Step	Step
[01]		Release the fixation underneath the foot support to adjust the optimal position.
[02]		Release the fixation underneath the seat to adjust the optimal seat position.
[03]		Fix the adjusted seat and foot support position by tightening the corresponding fixation lever.

12.7 Unweighting system h/p/cosmos airwalk se 135

The “h/p/cosmos airwalk se 135“ is a user-friendly and dynamic unweighting system with central point suspension for manual locomotion therapy. It improves the manual training due to constant un-weighting of the patient in the vertical movement area.

- The dynamic unweighting system with low inertia allows precise unweighting of the patient and enables a natural vertical movement for a more physiological motion.
- The stepless adjustable unweighting also allows children and light weighted subjects effective motion training.
- Easy operation: The subject can be lifted as well as lowered by a simple key stroke. This eases the preparation of the training and supports the training itself.
- The unweighting can be levelled precisely to the needs of the patient and ensures an optimal training environment.
- High patient comfort for more motivation.
- The high-class, breathable and very comfortable unweighting vest has a physiological form and is easily adjustable. This avoids dermal irritations and pressure marks to a large extent.
- The proper fitting of the unweighting vest enhances the mobility of the patient and allows a more physiological movement.
- Better ergonomics for better training results.
- The parameters of the running machine and the unweighting system can be changed during the training (speed, elevation, unweighting).
- The training phases can be extended, which results in a more effective therapy for the patient.
- The “h/p/cosmos airwalk se 135” can be used for a very wide field of applications. Therapeutic applications such as functional motion therapy, rehabilitation or neurology as well as competitive sports (e.g. coordination training for athletes, etc.).

h/p/cosmos airwalk se [cos30017va01]
including mercury med with adjustable handrails



h/p/cosmos airwalk se [cos30017va01]
without treadmill

12.8 Unweighting systems airwalk 70/160

	The h/p/cosmos airwalk is a pneumatic unweighting system with dynamic central point suspension. With the help of the system locomotion, therapy can start at an early stage. All exercises can be done in an upright functional position and a wider range of exercises is possible. Please refer to the additionally provided manual for the unweighting system for all safety notes and instructions for use including accessories.
h/p/cosmos airwalk 70 [cos10092] h/p/cosmos airwalk 160 [cos10093] **compressor** for models airwalk 70 / airwalk 160 [cos10094] **cable assembly** for h/p/cosmos airwalk 35/70/160 [cos13752]* It is possible to use the h/p/cosmos airwalk with the running machine series with track size 150/50 cm or 170/65 cm or 190/65 cm, and as well with most running machines produced by other manufacturers.	
* to be replaced every 6 months or earlier at the first sign of wear-and-tear	

12.9 Vests for subjects for airwalk systems

	The vests offer high compatibility at best attainable freedom of body motion. They do not have straps undercutting during gait and have an optimal fitting due to the individually adjustable strap system. Four different vests provide adaptation to all body sizes and forms. A special vest for children is also available. Additional straps for gait correction vest are included in the shipment. The vest can be adjusted by the testing person.
h/p/cosmos airwalk vest, red, waist 55-88 cm [cos10095]	
h/p/cosmos airwalk vest, blue, waist 81-112 cm [cos10096]	
h/p/cosmos airwalk vest, yellow, waist 112-145 cm [cos10097]	
h/p/cosmos airwalk vest, children [cos10112]	
⚠	Chest harnesses, patient vests, waist belts with leash and cuffs are not designed for direct skin or mucous membrane contact. Wear appropriate clothing.

12.10 h/p/cosmos robowalk® expander

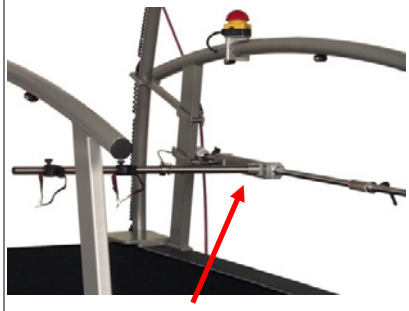
	First, elastic cables are attached to patient´s legs with comfortable leg cuffs. As the patient walks, the cables at the front assist the movement of the legs with support. The cables at the rear can be used also as resistance and for gait correction training. Both the front and back system can be utilized together for even greater training effects. By adjusting the angle of the support/resistance cables either vertically or horizontally, correction of movement is possible. The patented tension adjustment module involves readable scales on each cable for tension monitoring. For detailed instructions see separate operation manual for robowalk. Use only with safety arch, chest belt system and fall stop!

12.11 Wheelchair ramp

When using the wheelchair ramp pay particular attention to the gap between ramp and running belt so that hands, hair, clothing or other items do not get caught. The ramp must not touch the running belt as this will lead to excessive wear. Ensure that the ramp is stable and cannot slip. Be aware of danger of slipping or tripping on ramp. Do not attempt to enter ramp from the side. Only original h/p/cosmos wheelchair access ramps should be used.

wheelchair ramp 150/50 [cos16186-01]

12.12 Wheelchair stabilizer for oversize running machines



With the help of the h/p/cosmos wheelchair stabilizer, it is easy to keep wheelchairs with 3 or 4 wheels safely in line. The guide rail is fixed between the two pillars of the right-hand side handrail.
A front and a rear range limiter prevent the wheelchair from rolling too far to the front / back.
The frame of the wheelchair is fixed with adjustable clamps to the cross-bar of the stabilizer. The wheelchair application is only allowed in combination with the safety harness (chest belt and fall stop). Take care that the brakes on the wheelchair are deactivated (e.g. dismantle brake suspension). Re-activate brakes of the wheelchair after operating the wheelchair on the treadmill and before using the wheelchair over-ground or on the street.

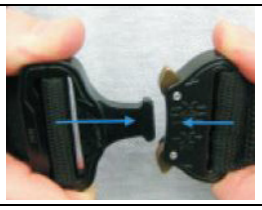
Wheelchair stabilizer for deck length 200cm: [cos10227] 250cm: [cos10226] 300cm: [cos00096110031]
Available for the h/p/cosmos running machine series with track size 200/75 cm (and bigger) with the mark “r”

- Adjust the range limiters properly to limit the operation range on the deck and to ensure the wheelchair does not fall off from the deck to the front or to the back.
- Use safety arch with chest belt and harness for additional safety and for additional range limiter.
- Fix the additional steel rope on the wheelchair frame similar to trailer safety ropes for bicycles for additional safety.
- Before using the running machine for any application without a wheelchair (running, cycling, skating etc.), the wheelchair stabilizer has to be dismantled for safety reasons.
- No remaining dangerous barrier, crossbar or other part of the wheelchair stabilizer must obstruct or injure the subject.

12.13 Safety arch with chest belt system

- Every time before using the safety arch with chest belt system, a visual examination of the system for detecting damage and wear-and-tear must be done. Especially the rope, the harness and all links such as the snap hook and the rope brake must be checked.
- All wear-and-tear parts of the system (rope, harness and all links such as snap hook and rope brake) are to be changed immediately in case of damage. At least every two years, all wearing parts are to be changed.
- Neither chest harnesses, patient vests, nor waist belts with leash and cuffs are designed for direct skin or mucous membrane contact. Wear appropriate clothing.

The safety arch with chest belt system is an indispensable accessory for stress testing, accident prevention and for the general safety of athletes. The chest belt secures the subject and prevents falling forward. The chest belt is connected via pull rope with the emergency stop at the crossbar of the safety arch. If a fall occurs (i.e. there is more than 10 kg (17.6 lbs) traction pulling on the harness), the switch will stop the running belt immediately.



h/p/cosmos safety arch with chest belt system [cos10079], available for all h/p/cosmos running machines.
The ceiling height should be considered:
Series mercury: at least 2.46 m (97.6 inches) with 0 % elevation, 2.57 m (101.6 inches) with 25 % elevation
Series quasar/pulsar: at least 2.51 m (96.5 inches) with 0 % elevation, 2.68 m (105.5 inches) with max. elevation
Chest belt system XXS [cos14903-02-XXS]* for children
Chest belt system S [cos14903-02-S]*
Chest belt system M [cos14903-02-M]*
Chest belt system L [cos14903-02-L]*
Chest belt system XL [cos14903-02-XL]*

* to be replaced every 6 months or earlier at the first sign of wear

The length of the rope should be adjusted so that the subject cannot use the rear 30% of the running deck.
Put on the chest belt so that the h/p/cosmos logo is at the front. In order to attach the carabiner, put the vertical belt (1) below the shoulder belts (2), facing the body, thereby unloading the seam at the joint (3). If the chest belt is put on backwards, inside out or twisted, a shearing strain may occur at the joints, which, in turn, may lead to loosening of the joints.

Safety precautions and operation

- The maximum body weight is 200 kg (440 lbs)
- Despite the fast stop of the running belt, skin-abrasion on the legs might occur if the user contacts the running belt when falling.
- Nevertheless, the risk of injuries is minimized drastically compared to a fall using no safety arch or compared to a fall outdoors.
- The ceiling height should be considered:
  h/p/cosmos mercury: at least 2.46 m (97.6 inches) with 0 % elevation, 2.57 m (101.6 inches) with 24 % elevation
  h/p/cosmos quasar or h/p/cosmos pulsar: at least 2.51 m (96.5 inches) with 0 % elevation, 2.68 m (105.5 inches) with max. elevation

12.14 Reversible running belt rotation for downhill walk

The optional function “reverse running belt rotation” permits simulation of a downhill run. To prevent any abuse, the function can only be activated by a key-operated rotary switch, located on the UserTerminal / external control terminal “control desk” of the oversize running machines.

- As the subject is running against the usual running belt rotation and therefore has no control of the UserTerminal, a supervisor must be present to control the running machine during the training.
- For safety reasons, the max. speed has been limited for the models with a cross-bar handrail or motor case cover.
- The patient must always be secured, either with the pull cord safety stop actuator or preferably with the safety arch and chest belt system.
- Turn the key-operated switch for the reverse belt rotation only when the running belt is not moving. Otherwise, the running machine may start in reverse mode at the next start.

Change from forward to reverse rotation

- Turn the key-operated switch and start the machine with no one on the running belt and only when the belt is not moving.
- Observe the belt position for 2 minutes and correct the belt position with the belt adjustment screw (see chapter 8.6. “Adjustment (centring) of the running belt ” on page 119. It is normal for the belt to move to one side after changing the belt rotation. Therefore the running belt should be readjusted to the centre of the running track.
- Once the belt is readjusted, STOP the belt and operate the machine with the subject on the belt.
- The function “reverse running belt rotation” will be announced by an acoustic signal and “r” is indicated. Speed will be indicated as a negative value “-0.0 ... -5.0“ while in operation.

Change from reverse to forward rotation

- Turn the key-operated switch and start the machine with no one on the running belt and only when the belt is not moving.
- Observe the belt position for 2 minutes and correct it with the belt adjustment screw (see above).
- Once the belt is readjusted, STOP the belt and operate the machine with the subject on the belt.

In most cases the readjustment of the running belt requires the same revolutions of the belt adjustment screw. Therefore we recommend noting the required revolutions. This will help to reduce the time needed for the adjustment procedure in future.

12.15 Pull cord safety stop actuator

This stop function is a safety feature that is used with a waist belt. The patient or athlete is connected via cord to a magnetic switch at the UserTerminal. In the event that the user falls, the magnet is ripped off the UserTerminal and the running machine stops immediately. With magnet detached, “PULL STOP“ will occur in the display. The pull cord safety stop actuator does not prevent the subject from falling. With reverse belt rotation (downhill), the patient must always be secured, either with the pull cord safety stop actuator or with the safety arch with chest belt system.

The length of the pull cord should be adjusted so that the subject cannot use the rear 30 % of the running deck. It limits the range of motion of the subject to the 70 % of the front part of the running deck length based on EN 957-6 norm.

Pull cord safety stop actuator (magnet with STOP function): [cos00098050043]

Chest harnesses, patient vests, waist belts with leash and cuffs are not designed for direct skin or mucous membrane contact. Wear appropriate clothing.

12.16 Bottle holder, drinking bottle

The bottle holder is available for all h/p/cosmos running machines and can be easily fixed with a clamp on a handrail with 60 mm diameter. The position of the bottle holder should not be at the rear end of the handrail, because this end must be reachable for the subject.

The bottle holder can also be used as a towel holder.

Bottle holder for handrail diameter 60 mm [cos11020]
h/p/cosmos drinking bottle 0.5 l [cos15485]

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12.17 Retrofitting UserTerminals / laptop for external control unit

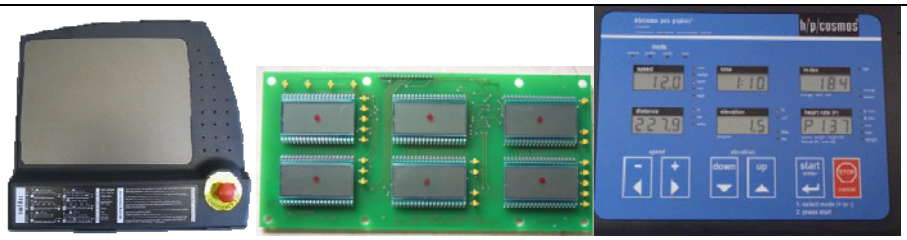
All lt-models can be retro-fitted with a UserTerminal. Oversized running machines, which are all equipped with an external control unit, can optionally be complemented with a UserTerminal at the handrail. This external UserTerminal is connected via interface RS232 (COM1) to the running machine (to connect other devices, e.g. PC or ECG, an additional interface (COM2 or COM3) on the running machine is necessary).

[cos14569-02]

UserTerminal TouchPanel for handrail (diameter: 60 mm)
with PC software h/p/cosmos para control®
connected via RS232 interface to the running machine
including external power supply (90...260 VAC to 12 VDC / 5 A)

[cos10002-02]

UserTerminal TouchPanel remote control
for table, with foot for desktop
with PC software h/p/cosmos para control®
connected via 5 meter cable to RS232 interface to the running machine
including external power supply (90...260 VAC to 12 VDC / 5 A)
(without holder for handrail of the treadmill)



UserTerminal Display Keyboard MCU5
for h/p/cosmos "lt-models", manufactured as of mid-January 2009 with MCU5 and pre-installed UserTerminal housing and blind cover.
Instead of the existing blind cover on the pre-installed UserTerminal, a circuit board with 6 LCD displays (4 digits, 7-segments), 24 LEDs and a keyboard with 6 keys are installed on the UserTerminal.

Complete kit [cos15312] please include the serial number of the running machine.
LCD circuit board [cos14292], membrane keyboard film [cos10198-01],
extra charge for travel costs and installation

Notebook holder [cos13320-01]

Movable notebook holder for the external control unit.
The notebook holder can be turned to the field of vision of the athlete or patient.

Laptop computer [cos13476]

12.18 Retrofitting emergency stop buttons

		Emergency stop buttons with magnet holder external emergency stop button with magnetic holder for easy fixation on h/p/cosmos running machines, for example on handrail, plug: 3 pin XLR male
[cos100548] incl. 10 m cable, no spiral cable [cos15933] incl. 5 m spiral cord cable.		
	Emergency stop extern 2 m mount 60 mm (incl. clamp fixation) external emergency stop for handrail fixation, only for handrails with rail diameter d = 60mm plug: 3 pin XLR male To connect this external emergency stop with the treadmill, ensure that your treadmill has a rear panel terminal for external emergency stops. If there is no socket for external emergency stops, order the special rear panel terminal for additional keyboard [cos10109]	
[cos15021] extern incl. 2 m spiral cord, mount 60mm (incl. clamp fixation)		
	Emergency stop extern 10 or 15 m (without fixation) external emergency stop without fixation on the treadmill, plug: 3-pin XLR plug male To connect the external emergency stop with the treadmill, ensure that your treadmill has a rear panel terminal for external emergency stops. If there is no socket for external emergency stops, order the special rear panel terminal for additional keyboard [cos10109]	
[cos15294L10m] incl. 10 m cable, no spiral cable, please stipulate the serial number of the device [cos15294L15m] incl.15 m cable, no spiral cable, please stipulate the serial number of the device		

12.19 Safety multiple socket

	The stable safety multiple socket can be used for the safe connection of a medical h/p/cosmos treadmill with peripheral devices such as PCs, printer or monitors. It meets all requirements of EN60601-1 for multiple sockets for creating connections to a medical electrical system within the patients environment, i.e. ≤ leakage current of 0.5 mA for the complete system.
safety multiple socket [cos100157]	

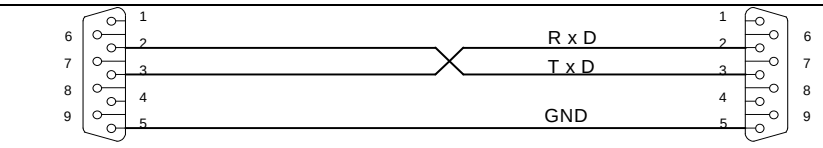
- Use a dedicated line only. Due to the very high load of treadmills, it is never allowed to connect more than one treadmill or other consumer devices with high load to the multiple safety socket.
- The power consumption of the consumer devices additionally connected to the treadmill must be lower than 300 W in total. Furthermore the additional devices must be connected to the treadmill via a multiple safety socket.
- When connecting treadmills to the multiple safety socket, there are no performance-limitations at low-performance applications (walking, slow running). For high-performance applications (fast running, sprints, etc.), the use of multiple safety sockets may result in performance limitations.
- For high performance applications, a 3-phase powered treadmill is recommended.

12.20 RS232 interface / USB converter

Connecting a running machine to a medical device results in a medical system. Always use IEC 60601-1-approved potential isolation components when linking medical devices via interface.
Only authorised trained staff is authorized to perform this connection.
This medical system has to be connected via a potential balance equalization cable with the provided connector bolt and bearing in the designated room.

Standard for all devices is ONE serial interface COM1. Optionally further serial interfaces COM2, COM3 and COM4 are available for some models. For further information, please contact your local dealer or h/p/cosmos. The interface protocol h/p/cosmos coscom© is available on request or can be found at www.coscom.org. The incorporated protocols (e.g. for ECG-devices) are listed under OPTION 20 / OPTION 21. See the compatibility list of the RS232 interface in the chapter entitled “Technical data“. More recent computers will only have a USB interface instead of the RS232 interface. In that case a “USB to RS232 interface adapter cable“ is available at h/p/cosmos under order number [cos12769]. To control via USB interface, the processor must be a Pentium 1.8 GHz or higher.

Interface cable RS232 for connection to PC
for h/p/cosmos para graphics®, h/p/cosmos para control®, PC, ECGs, ergospirometry devices



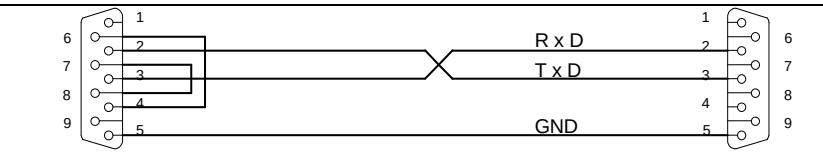
PC COM1 oder COM2
CONNECTOR DB9
Buchse / female

Laufband / treadmill
CONNECTOR DB9
Stecker / male

9-pole Sub- D
(male - female)
with crossed
transmission-
receive-cable
(PIN 2 and PIN 3)

[cos00097010034] 5 m cable, [cos00097010035] 10 m cable

Interface cable RS232 for connection to ECG Schiller (Schiller AT 10 / AT 60 or CS 100 / CS 200)

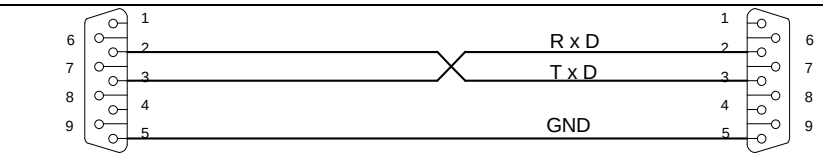


EKG / ECG Schiller
CONNECTOR DB9
Stecker / male

Laufband / treadmill
CONNECTOR DB9
Stecker / male

[cos00097010036] 5 m cable

Interface cable for connection ergospirometry JAEGER / VIASYS / CardinalHealth / CareFusion OXYCON



OXYCON
CONNECTOR DB9
Buchse / female

Laufband / treadmill
CONNECTOR DB9
Stecker / male

OXYCON
Alpha / Delta /
Champion / Pro

[cos00097010034] 5 m cable, [cos00097010035] 10 m cable
Connect the running machine interface with an available serial interface (COM1 ... COM4) at the PC of the OXYCON. Do not use the female connector at the OXYCON with the letters "treadmill/running machine".
Important: As of January 2000 use h/p/cosmos coscom© RS232 interface protocol.

Interface converter for printer

h/p/cosmos sports & medical / germany
http://www.h-p-cosmos.com
email@h-p-cosmos.com
Training-/Test Protokoll
Datum: 25.06.2012
Zeit : 16:25
Mode : manual

Name: _____

Notiz:

_____

_____

Zeit hh:mm:ss	Distanz km	Geschwindigkeit km/h	Steigung %	Herzfrequenz 1/min
00:00:00	0.000	0.9	0.0	085
00:00:05	0.001	1.2	0.0	089
00:00:10	0.007	7.8	0.0	097
00:00:15	0.021	10.0	0.0	105
00:00:20	0.035	10.0	0.0	114
00:00:25	0.049	10.0	0.0	122
00:00:30	0.063	10.0	0.0	124
00:00:35	0.077	10.0	0.0	129
00:00:40	0.091	10.0	0.0	130
00:00:45	0.104	10.0	0.0	133
00:00:50	0.118	10.0	0.0	133
00:01:55	0.132	10.0	0.0	134
00:01:00	0.146	10.0	1.0	137
00:01:05	0.159	10.0	1.0	139
00:01:10	0.173	10.0	1.0	139
00:01:15	0.187	10.0	1.0	141
00:01:20	0.201	10.0	1.0	140
00:01:25	0.214	10.0	1.0	142
00:01:30	0.228	10.0	1.0	144
00:01:35	0.242	10.0	1.0	145
00:01:40	0.256	10.0	1.0	144
00:01:45	0.269	10.0	1.0	144
00:01:50	0.283	10.0	1.0	145
00:01:55	0.297	10.0	1.0	147
00:02:00	0.311	10.0	1.5	149
00:02:05	0.325	10.0	1.5	152
00:02:10	0.338	10.0	1.5	152
00:02:15	0.352	10.0	1.5	153
00:02:20	0.366	10.0	1.5	153
00:02:25	0.380	10.0	1.5	154
00:02:30	0.393	10.0	1.5	153

Connect the printer (with PCL printer language and with a serial interface) via interface cable with the serial interface RS232 of the running machine.

Attention: For a printer with a parallel interface you will need a commercial interface converter, available in every computer store, at your local dealer or from the manufacturer (h/p/cosmos order no. [cos10056]).

If option 20: 3 is chosen (printer protocol see list of options), data will be printed out as shown in the left example.

12.21 POLAR heart rate measurement system

Stop training immediately if you feel sick or dizzy and consult your doctor.
In the case of interference do not rely on the indicated values of the wireless heart rate transmission.
Precision of heart rate measuring: + / - 1 %, resp. + / - 1 beat per minute.
Pay attention to the advice regarding safety and warnings about possible interferences in the chapters on errors, technical data, EMC, and installation in this manual.

WARNING: Heart rate monitoring systems can be inaccurate. Incorrect and/or forbidden use and/or overtraining can lead to serious injury or even death. If you feel faint, stop training immediately.

You can use all POLAR transmitters (coded and uncoded) with your running machine. For running machines of generation MCU 4.0 with firmware version lower than V 3.01.1, an EPROM update is available for the use of coded transmitters. Note: Even when using the coded senders, the transmission of the heart rate to the treadmill is still uncoded. The models h/p/cosmos locomotion, h/p/cosmos pulsar, h/p/cosmos venus and h/p/cosmos saturn are equipped with the POLAR W.I.N.D. transmitter with WearLink technology and coded transmission. The transmitter is only activated if placed correctly on the body. For correct placement of transmitter belt, see chapter 5 entitled “Operation” and chapter 5.9.4 entitled "Cardio mode".

only rubber band, without transmitter	[cos10905]	POLAR chest belt XS
	[cos10906]	POLAR chest belt S
	[cos10165]	POLAR chest belt M
	[cos10907]	POLAR chest belt L
	[cos10902]	POLAR Transmitter Set T31 uncoded, with chest belt rubber band size M
	[cos15178]	POLAR Transmitter Set T34 uncoded, extended range with chest belt rubber band size M
	[cos100420c]	POLAR W.I.N.D. WearLink chest belt
	[cos100420b]	POLAR W.I.N.D. Transmitter TRX24

Battery of the transmitter

At an average application of 2 hours per day, the life-span of the battery amounts to approx. 1 year. The receiver is incorporated in the running machine and requires no battery. It is supplied by the running machine.

Radius of transmission

The transmitter radius amounts to approx. 80 to max. 120 cm. The POLAR W.I.N.D. transmitter has a transmission range of approx. 10 meters. If you run several running machines or other training devices on the same heart rate measurement system, you should keep a gap of at least 100 cm between the devices to exclude interference.

Transmission problems

- The setting "POLAR logo upside down" is recommended for approximately 10 – 15 % of the subjects.
- The setting "transmitter at the back of the subject" is recommended for approximately 1 – 2 % of the subjects.
- However, always try the "normal" setting first.

Cleaning

The chest belt is washable. In this case loosen the belt from the transmitter. Please take care not to crush the two electrodes of the belt. After having loosened the transmitter off the belt, wash the belt and especially the electrodes with warm water and mild soap. Do not clean the electrodes mechanically. Do not use alcohol.

If an irregular pulse display occurs in spite of a faultless technical condition, please check your pulse manually or, when in doubt, consult your doctor.

12.22 „Science port“ / raw data of speed sensor

As an option an additional speed sensor is available, which provides the speed data in digital form without any averaging algorithm.
For scientific instruments and applications the raw digital speed signal data of the treadmill speed sensor are accessible here at an additional jack. It allows even access to falling and rising signal flank without any averaging calculation.
order number: [cos101277]
Please quote the model name, type and serial number in case of retrofitting request.

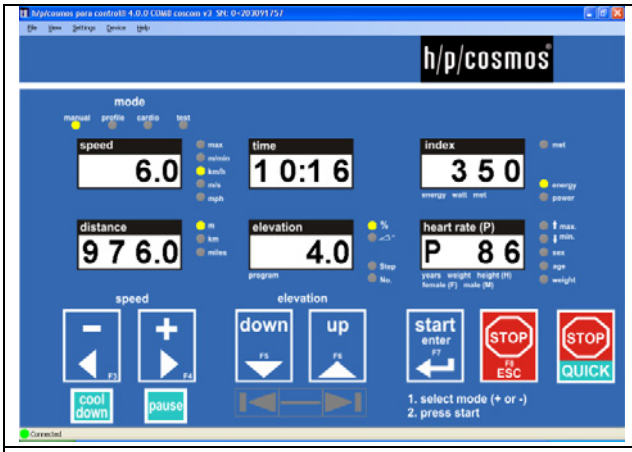
12.23 PC software h/p/cosmos para control® 4.1

h/p/cosmos para control® can be found on the h/p/cosmos demo & info DVD [cos10067], which is delivered together with every h/p/cosmos treadmill ergometer. Alternatively the software can be downloaded at
http://www.h-p-cosmos.com/en/software/para_control.htm
A manual is also available in which all functions of the new para control® are described in detail. For warnings, system requirements and application regulations of the software, please read the separate software manual.

Applications

- Remote control of all running machine functions during tests or exercise via interface from the PC.
- Demonstrations for large groups (students, audiences, etc.) with the help of a big screen or digital projector.
- Control of multiple h/p/cosmos treadmill ergometers via one PC.
- Firmware update via Flash-Eprom.
- Service & maintenance work, setup, programming and display of error codes (obligatory for running machines without hardware UserTerminal).
- Testing of the RS232 interface of the PC, testing of the RS232 interface cable in case of communication problems with ECG or ergospirometry.

The red coloured STOP and QUICK STOP button on the UserTerminal ARE NO EMERGENCY BUTTONS which are disconnecting from the mains power supply. They are no emergency control based on IEC 60601-1:2005.



Most of the additional functions of para control® require an interface connection via the sophisticated coscom v3 protocol, which is integrated in all h/p/cosmos treadmill ergometers with MCU5 control electronic (as of manufacturing date 12/2007).

Treadmills which are equipped with MCU4 control electronics (until manufacturing date 12/2007) have integrated the forerunner protocol coscom v2 but can be refitted with coscom v3 via a simple firmware update.

h/p/cosmos para control® 4.1 [cos10071 -V4.1.0]
Interface connection cable RS 232 5m [cos00097010034]
Interface connection cable RS 232 10m [cos00097010035]
USB to RS232 interface adapter-cable [cos12769-01]

The free PC software h/p/cosmos para control® is the result of extensive improvement and functional expansion of the well-known version 3.0. In addition to the pure remote control function of h/p/cosmos treadmill ergometers via the PC, the software now provides additional functions such as an option setting configuration tool with integrated storage function, firmware update over flash eprom, quick-stop key, cool-down key, pause key, target speed settings, target elevation settings, stop countdown, display reset, etc.

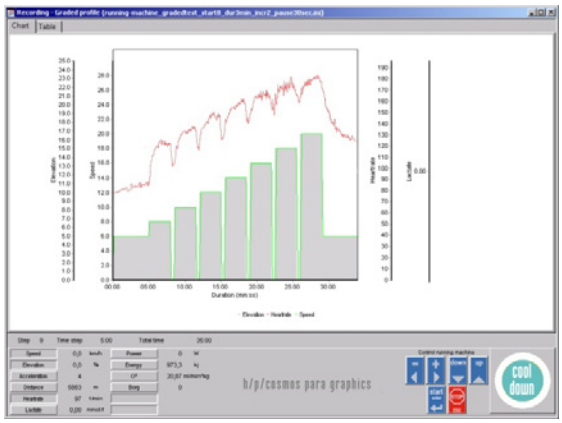
The software is not designed for medical diagnostics and evaluation. The medical treadmill can support the doctor and patient in their decision to perform stress tests and movement therapy consisting of walking and running.

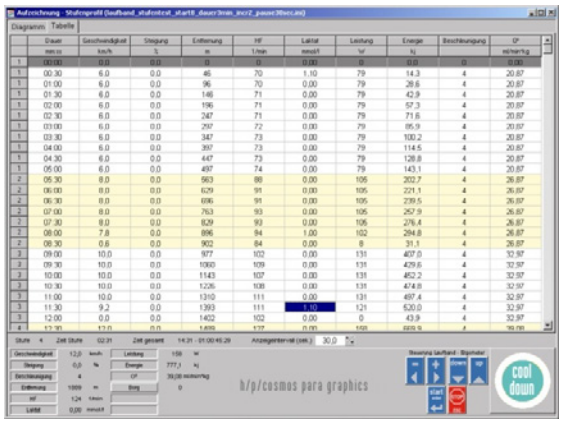
12.24 PC Software h/p/cosmos para graphics®

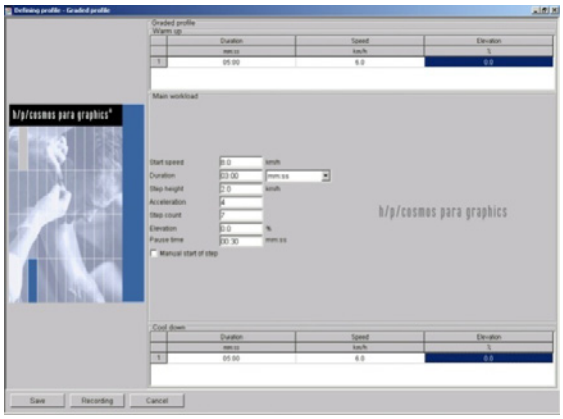
The software h/p/cosmos para graphics® supports the user of automation processes especially in performance diagnostics. The user is able to fully concentrate on the subject. The software is also suited for sports science applications, for controlling the device and for documentation of exercise programs. h/p/cosmos para graphics® makes it possible to register and administrate heart rate values and endurance parameters online.
The treadmill can be controlled automatically. The software is not designed for medical diagnostics or evaluation.
The treadmill data can support the doctor's decision.

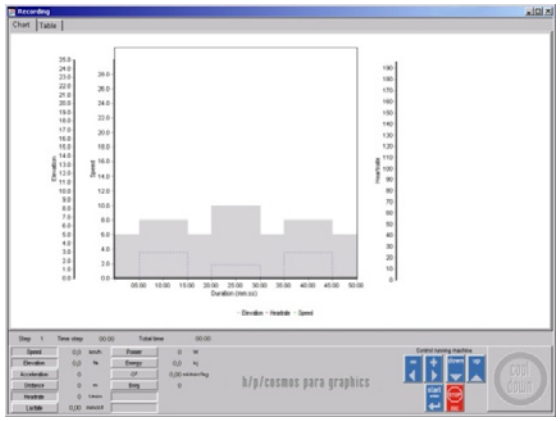
Data can be converted by the software for data transfer to EXCEL and further evaluation e.g. by EXCEL or h/p/cosmos para analysis® software. Data transfer to an editor software for further data processing is also possible with the help of the h/p/cosmos para graphics®. A connection cable from the running machine to the personal computer is needed for data transmission. This connection cable is available as optional equipment (see also optional equipment serial interface).

Further information as well as a demo version is available in the separate instruction manual.









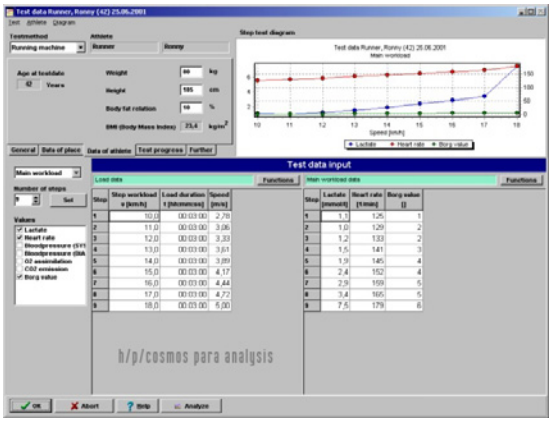
Read the separate software manual for safety notes, operation and system requirements of the software.

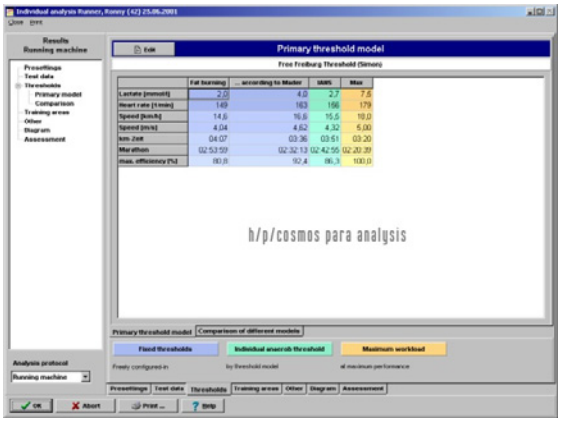
h/p/cosmos para graphics® [cos10156]

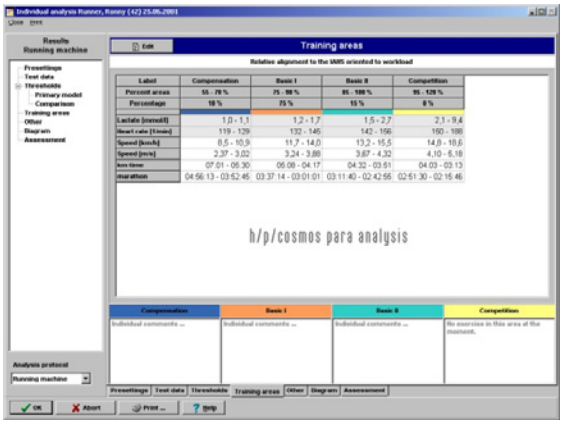
12.25 PC Software h/p/cosmos para analysis®

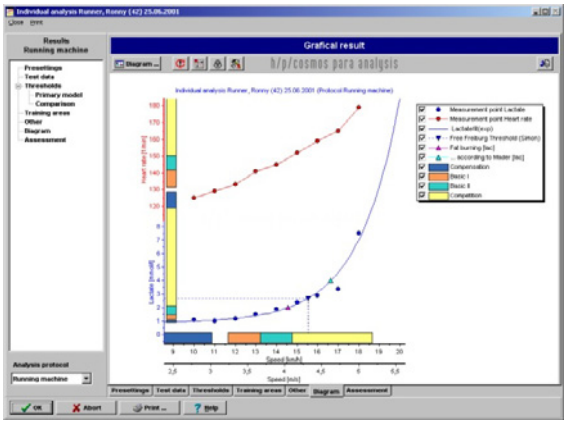
The software h/p/cosmos para analysis® is an evaluation software for fitness performance diagnostics and training control that allows the creation of individual training plans. The evaluation of heart rate and lactate curves after graded tests is possible on the basis of individually selected threshold value models in graphics and tables. Test data can be entered into h/p/cosmos para analysis® manually or by importing from h/p/cosmos para graphics®: The entry and evaluation of desired parameters, e.g. lactate or heart rate as well as blood pressure or the Borg scale can be defined or added. Data of the software PA7000 and of the devices of the POLAR S series can be imported as well. The clear design of the program allows an easy evaluation. The comprehensive printout simplifies the interpretation and is the basis for best possible coaching.

The software is not designed for medical use diagnostics and evaluation. The treadmill data can support the doctor's decision.









With this software it is possible to adapt the integrated test methods and to generate individual ones. Test devices - even field test as well as time and performance parameters - are freely definable. The models for the evaluation of the individual anaerobic threshold - and several simultaneously for the comparison option - are freely definable. It is not only possible to evaluate the individual anaerobic thresholds in the lactate performance diagnostics, fixed thresholds can also be created. An evaluation according to Conconi can also be done. The evaluation results are shown graphically and in tabular form. The scaling of the diagram can be adjusted individually. Clear graphics of training categories and intensities are the basis for successful training plans. Read the separate software manual for safety notes, operation and system requirements of the software.

h/p/cosmos para analysis® [cos10155]

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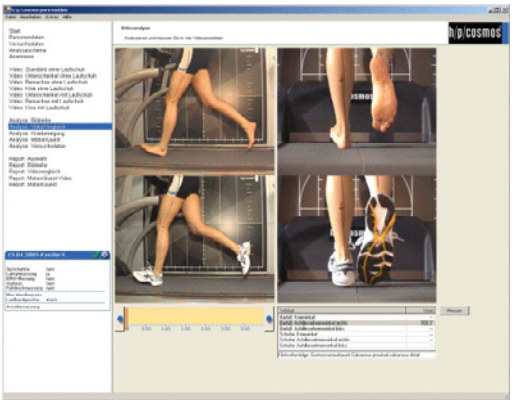
12.26 PC Software h/p/cosmos para motion®

The h/p/cosmos para motion is a software for recording and evaluating video analysis with individual report for printout, incl. control functions of h/p/cosmos running machines. The software is not designed for medical diagnostics or evaluation. The treadmill data can support the doctor's decision.



Basic functions and features

- Digital, software-based video recordings with treadmill control for all h/p/cosmos treadmills parallel to recording with feedback.
- Creation of individual analysis patterns for different applications.
- Intelligent video management system in flexible data base. The video clips are saved in the data base in accordance with the chosen analysis pattern, separate saving of data can be omitted.
- Medical history tool with information database of the most common gait and motion-specific disorders with the possibility to transfer to the individual report.
- Integrated player for the analysis of several video clips.
- Video overlay of up to eight videos.
- Full screen mode.
- Various 2D analysis tools such as gridlock and grid.
- Flexible 2D painting tools such as rectangles, tracking lines, arrows and text fields.
- Tools and measurement tools for the fast detection of angles and distances.
- Definition of gait specific situations (e.g. first peak, standing phase) for faster synchronisation and easier analysis.
- Report function for creation of individual reports.

An interface connection cable from the running machine to the personal computer is required for control and data communication. The interface cable and USB-RS232 converter and second port COM2 are available as optional accessories.

h/p/cosmos para motion "basic"	[cos15508v5bas]
h/p/cosmos para motion "standard"	[cos15508v5sta]
h/p/cosmos para motion "professional"	[cos15508v5pro]
RS232 interface connection cable 5 m	[cos00097010034]
USB to RS232 interface adapter	[cos12769-01]

Detailed specifications and operation instructions can be found in the separate software operation manual and at the website www.h-p-cosmos.com/en/software/para_motion.htm

13 Disposal

Upon request and at the expense of the client, h/p/cosmos might take over the disposal of old or defective devices. Please contact service@h-p-cosmos.com for a detailed offer. Note the information for possible disposal of the running machine parts or components through the client or a subcontractor.
The disposal of the device should be accomplished by appropriate personnel. Remove doors to prevent accidents such as suffocation.

The h/p/cosmos devices are marked with following sign/symbol on the name plate:
Symbol for collection, treatment, recycling and disposal of waste electrical and electronic equipment (WEEE) as prescribed in directive 2002/96/EC of January 27, 2003 of the European Parliament and Council: waste electrical and electronic equipment must be collected and recycled to reduce the waste management problems linked to heavy metals and flame retardants.

h/p/cosmos EAR WEEE reg. no. DE 42594388

Disassemble and cut up

Use personal protective equipment when cutting up material of any kind with the appropriate tools (eye-protection, dust-mask, etc.). Contact service@h-p-cosmos.com to receive the safety data sheet of the European Commission Directive 91/155/EEC.

h/p/cosmos running machine

h/p/cosmos running machines consist of powder-coated and galvanized metals from different producers and qualities, stainless steel parts, aluminium parts, plastics, rubber, electronics with cables, boards and condensers as well as batteries. These materials can be recycled by bringing them to the official municipal valuable substance depot or to authorized disposal partners of valuable substance disposal. Pay attention to the regulations of the disposal company. The material of the running surface (sliding plate) has the disposal key number 57109 and may be recycled as well.

h/p/cosmos service oil / grease

Service oils for belt lubrication have the disposal key numbers 130202 and 130203 and have been assigned to class I, which means that they can be recycled according to local regulations. Both products have not to be marked for identification according to the EU guidelines/ordinance on hazardous substances. For oversize running machines with running deck size 200/75 cm and larger, a bit of copper paste grease is used for the elevation system.

h/p/cosmos running belt

In order to find out what materials have been used in the device, please contact service@h-p-cosmos.com, and provide the serial number of the running machine. Materials may differ from application to application.

14 Appendix 1: Certificates

Latest versions always: http://www.h-p-cosmos.com/en/company/certificates.htm

14.1 Certificate of the TSA (TÜV) according to ISO 9001

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH
certifies that

h/p/cosmos

h/p/cosmos sports & medical gmbh
Am Sportplatz 8
D-83365 Nußdorf

has established and applies
a Quality Management System for

Design and development, production, distribution and service of treadmill ergometers, ergometers, diagnosis, therapy and training systems

An audit was performed, Report No. 70078857
Proof has been furnished that the requirements according to

ISO 9001:2008

are fulfilled. The certificate is valid until 2013-11-30
Certificate Registration No. 12 100 24355 TMS

Munich, 2010-12-17

QMS-TGA-ZM-07-92

TÜV SÜD Management Service GmbH • Zertifizierungsstelle • Ridlerstraße 65 • 80339 München • Germany

MSB1-TGA-07/10

14.2 Certificate of the TSA (TÜV) according to EN ISO 13485

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Product Service

CERTIFICATE

No. Q1N 10 12 45283 007

Holder of Certificate: **h/p/cosmos sports & medical gmbh**
Am Sportplatz 8
83365 Nussdorf - Traunstein
GERMANY

Facility(ies): h/p/cosmos sports & medical gmbh
Am Sportplatz 8, 83365 Nussdorf - Traunstein, GERMANY

Certification Mark: TÜV SÜD EN ISO 13485

Scope of Certificate: **Design and development, production, distribution and service of treadmill ergometers, ergometers, diagnosis and therapy systems**

Applied Standard(s): EN ISO 13485:2003/AC:2009
Medizinprodukte – Qualitätsmanagementsysteme – Anforderungen für regulatorische Zwecke
Medical Devices – Quality Management Systems – Requirements for regulatory purposes

The Certification Body of TÜV SÜD Product Service GmbH certifies that the company mentioned above has established and is maintaining a quality system which meets the requirements of the listed standard(s). See also notes overleaf.

Report No.: 71375752

Valid until: 2013-11-30

Date, 2010-12-16

Hans-Heiner Junker

TÜV SÜD 444166

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TÜV SÜD Product Service GmbH
Zertifizierstelle
Ridlerstraße 65 · 80339 München
Germany

Akkreditiert durch
Zentralstelle der Länder für Gesundheitsschutz bei Arzneimitteln und Medizinprodukten
ZLG-ZQ-999.98.12-46

TÜV®

ZAS / 06.10

14.3 EC Certificate of the TSA (TÜV)

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Product Service

EC-CERTIFICATE

Full Quality Assurance System

(Annex II, section 3 of the Directive 93/42/EEC on Medical Devices)

No. G1 08 12 45283 005

Manufacturer: **h/p/cosmos sports & medical gmbh**
Am Sportplatz 8
83365 Nussdorf - Traunstein
GERMANY

Facility(ies): h/p/cosmos sports & medical gmbh
Am Sportplatz 8, 83365 Nussdorf - Traunstein, GERMANY

Product Category(ies): **Treadmill-Ergometer Systems**

The Certification Body of TÜV SÜD Product Service GmbH declares that the aforementioned manufacturer has implemented a quality assurance system for design, manufacture and final inspection of the respective products / product categories according to Annex II section 3 of the Directive 93/42/EEC on Medical Devices. This quality assurance system conforms to the provisions of this Directive and is subject to periodical surveillance. For marketing of class III products an additional Annex II.4 certificate is mandatory. See also notes overleaf.

Report No.: 71346149

Valid until: 2014-01-31

TÜV SÜD 352302

Date, 2009-02-01

Hans-Heiner Junker

TÜV SÜD Product Service GmbH is Notified Body according to Council Directive 93/42/EEC concerning medical devices with identification no. 0123.

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TÜV SÜD Product Service GmbH · Zertifizierstelle · Ridlerstrasse 65 · 80339 München · Germany

15 Appendix 2

15.1 Calculation of the UKK Fitness Index

UKK refers to the initials of Urho Kaleka Kekkonen, founder of the UKK Institute in Tampere, Finland.
The UKK Walk Test makes it possible to predict cardiorespiratory fitness (VO2max) and therefore the physical aerobic condition of the subject based on fast 2 km walk. Based on this result, a Fitness Index is calculated with the help of a formula that includes gender, age, height, weight, test time on and average heart rate during or at the end of the test, thereby determining whether the physical condition of the subject is above or below average. The average value of the four measured heart rate values is used to calculate the Fitness Index. The value of 100 is an average index. If somebody's Fitness Index value is 90, his aerobic fitness is slightly below average. An UKK Fitness Index of 110 on the other hand represents the aerobic fitness above average.

The test result is the Fitness Index which is calculated as follows (according to gender):
Men: Fitness Index = 420 + A x 0.2 – (T x 0.19338 + HR x 0.56 + [W : (H2) x 2.6])
Women: Fitness Index = 304 + A x 0.4 – (T x 0.1417 + HR x 0.32 + [W : (H2) x 1.1])

Explanation			
A (Age) =	Age in years	T (Time) =	walking time for 2 km in seconds
HR (Heart Rate) =	average heart rate during the test in bpm	W (Weight) =	Weight in kg
		H (Height) =	Height in cm

Example: Age: 50 years, Weight: 105 kg, Height: 188 cm
Duration of test: 17:34 = 1054 seconds
Heart rate at 500 m = 158 bpm, 1000 m = 156 bpm, 1500 m = 160 bpm, and 2000 m = 155 bpm
Average heart rate (158 + 156 + 160 + 155) : 4 = 157 bpm
Fitness Index = 420 + 50 x 0.2 – (1054 x 0.19338 + 157 x 0.56 + (105: (1.882) x 2.6)) =
420 + 10 - (203.8 + 87.9 + 29.7 x 2.6) = 430 – 368.9 = 61

An Fitness Index value less than 70 is below average (average value = 100). Conclusion: In this case a subject needs some endurance training.

The UKK Walk Test is suitable for all healthy persons between the age of 20 and 65 years. The results will be less accurate with people who are overweight. Athletes usually do not reach the required heart rate when performing the test. The results will also be less accurate with people older than 65 years.

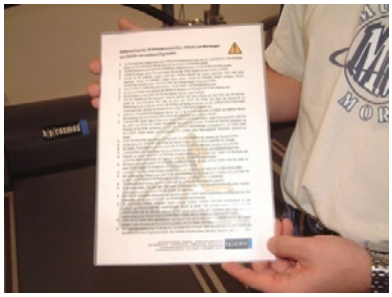
Originally, the UKK Walk Test was designed for a larger number of subjects for mass testing i.e. for testing of a group of people in a short time by sending them off in 1/2 minute intervals on the 2 km distance track. Thus, the UKK Walk Test was not originally designed as a typical test for the treadmill, however it fits for this purpose also.

Advantages of performing the UKK Walk Test on the treadmill:
- Being able to measure the precise time and distance of the test (it is exactly 2 km) with the heart rate control (recommendation is to use heart rate monitor)
- Constant supervision of the subject by a doctor or trainer for safe and fast speed
- The Fitness Index and documentation can be automatically displayed with the help of either a printer or PC connection.

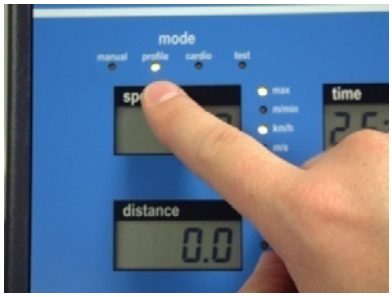
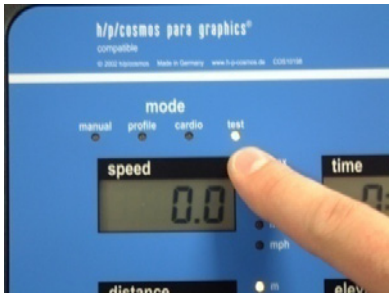
A serial printer or a PCL printer with parallel/centronics plug und converter [cos10056] can be connected directly to the h/p/cosmos running machine. Following data can be printed after the UKK Walk Test even without using any PC: UKK Fitness Index, date, time, test duration, distance, elevation, heart rate, age, gender, body mass index (BMI).

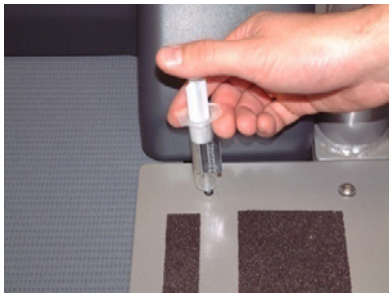
15.2 Instruction protocol, checklist

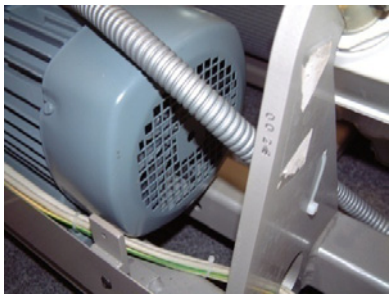
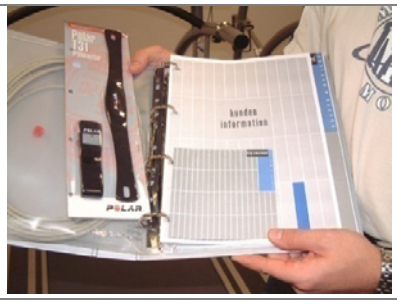
Once the installation of the running machine has been completed, the h/p/cosmos employee or h/p/cosmos partner starts commissioning of the device and instruction of the user. It is important to include all people in the instruction and commissioning who are going to work with the running machine. After the instruction is completed, the instruction protocol is to be signed by the h/p/cosmos technician and all trained persons. Signed instruction protocol, signed delivery note and the registration form are to be sent to h/p/cosmos.

	Instruction on general operation	
1.		Hand over operating manual. Inform about operating and service manual (always keep one within reach of all users). accomplished ❑
2.		Refer to safety notes, warnings and precautions in this manual. Place the print-out of the safety instructions (DIN A4 form in the delivery folder) close to the treadmill. Children are not allowed near or on the treadmill. For “higher-risk applications” or where a fall would lead to unacceptable risks, a safety arch with chest belt system and fall stop prevention has to be used. accomplished ❑
3.		In particular point out the necessary safety zone. Keep a safety zone of at least 2 m in length and the treadmills width behind the running machine and 1 x 1 m in front of the running machine. In case of reverse belt rotation, the frontal safety zone should be same size as the rear. See chapter 5.1 entitled “Operation, General”.

	Instruction on functions	
4.	 	How to switch the running machine ON and OFF properly. 1 - 2 minutes warm-up (delay) time for medical machines. Different ON/OFF buttons and/or expulsion fuse for sports and medical devices as well as ON/OFF button at the UserTerminal. accomplished ❑
5.		Explain safety features that the delivered model is equipped with, for example: emergency stop, quick stop, safety harness, etc. Do not use the emergency stop button for normal switching OFF of the device. 1 - 2 minutes warm-up time (delay before next power on) for medical machines. accomplished ❑
6.		Explain the display panels. What does which display stand for? accomplished ❑
7.		Explain manual operation of running machine. Inform about the - limit of max. speed for beginners - possibility of locking each single mode or all modes on request - possibility or necessity of locking the device against unauthorised users. accomplished ❑

8.		Operation of running machine via program mode. Refer to the list of programs in the instruction manual. accomplished ❑
9.		Operation of running machine via cardio-mode (heart rate-controlled load). accomplished ❑
10.		Inform about correct heart rate measurement and limitations: correct adjustment of chest belt, how to handle problems and disorders, possible causes of interferences and failures (PCs, quartz watches, monitors, cables, etc.). accomplished ❑
11.	 	Explanation of test mode and the integrated test-programs, inform about interface and compatibility list. Potential isolation for any interface linkage is obligatory in the field of medicine! Only connect to coscom v3 - compatible and authorized host equipment. Do not connect to equipment or software which is not explicitly declared as compatible by h/p/cosmos and by the other manufacturer. Inform about the h/p/cosmos software programs h/p/cosmos para control®, h/p/cosmos para graphics®, h/p/cosmos para analysis® and h/p/cosmos para motion® for documentation and visualization of data. accomplished ❑
12.		If device includes reverse-belt rotation: adjust running belt accordingly. Customer must try to adjust at least once. Make note of the necessary settings and adjustments. rotations: ❑ ¼ ❑ ½ ❑ ¾ ❑ 1 ❑_____ direction: ❑ clockwise ❑ counter-clockwise accomplished ❑

	Instruction on maintenance works	
13.		Hand over and explain service-box. The manufacture recommends a service contract through an authorised h/p/cosmos service technician. Lack of maintenance, poor maintenance or unauthorized servicing/repairs together with improper or lack of safety checks can lead to a risk of injury to users or damage to the running machine. This could also lead to loss of manufacturer's warranty and/or third party liability. accomplished ❑
14.		Correct adjustment of levelling sockets. Check weight load on the levelling sockets by trying to lift up the treadmill frame. accomplished ❑
15.		Proper adjustment of running belt with regulation screw and allen key. For each change of running belt direction there are two adjustment steps: a) Turn key at the back of the UserTerminal b) Adjust regulation screw according to previously defined value. **Pull out allen key!** accomplished ❑
16.		Lubrication of running belt when "OIL"-message is indicated (quantity, intervals according to this manual, distribution of oil by "duck-walking"). Use only original h/p/cosmos lubricant authorized for this model of running machine. Observe additional lubrication requirements. After running belt lubrication, the position of the running belt must be checked once more and be adjusted if necessary. accomplished ❑
17.		Delete "OIL"-message with option 01. accomplished ❑

18.	 	Inform the user about cleaning of running machine, motor area and especially the light barriers and ventilation grid. Before opening the motor hood, always pull the plug from the mains. Maintenance on medical products and electrical devices may only be performed by authorised and trained personnel who are certified by h/p/cosmos. accomplished ❑
19.		Inform the user about periodically recurring maintenance intervals and obligatory safety controls as well as the danger of disregarding these points. Offer and recommend maintenance contract through authorized and trained personnel. accomplished ❑
	Advice and support documents	
20.		Hand over and explain delivery papers (folder). Fill out registration form and send it to h/p/cosmos sales. Let the customer sign the delivery note and instruction protocol and send it back to h/p/cosmos sales immediately. Ask for brochure of customer and send it to the sales department at h/p/cosmos. accomplished ❑

15.3 Instruction protocol, signatures

By signing this protocol, the authorised h/p/cosmos technician and the h/p/cosmos customer confirm the receipt and understanding of all warnings, safety information, the performed instruction and commissioning according to form cos15228-03. The customer and user confirm the receipt of the listed devices including all accessories and options according to the h/p/cosmos delivery note. Disregard of warnings, disregard of intended and forbidden use, safety notes or precautions as well as unauthorized maintenance or lack thereof and/or regular safety checks may lead to injuries or even death and/or can damage the device. This will furthermore result in loss of liability and warranty. Please fill out the instruction protocol and send it back to h/p/cosmos via Fax to +49 86 69 86 42 49, or via email to sales@h-p-cosmos.com or via post

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h/p/cosmos sports & medical gmbh
Am Sportplatz 8
DE 83365 Nussdorf-Traunstein
Germany

customer's (end-user's) stamp / customer address:

h/p/cosmos device, model name	device serial number

instructor	name in clear block letters	h/p/cosmos dealer / technician	date and signature

instructed persons / customer / user / operator	name in clear block letters	position / function / department	date and user's signature

15.4 Service report – [cos15531]

h/p/cosmos service report form for service no. _____

☐ repair	☐ maintenance	☐ maintenance contract	☐ delivery / installation
device type		business hours	
serial number			
date of delivery		distributor name	
company / organisation		street	
contact person		ZIP code / city	
customer no.		phone / ext.	
department		location / room no.	

error description according to customer's explanation / detected error

operating data of the MCU / UserTerminal before servicing

OP 02:	km	OP 03:	h	OP 04:	h	OP 05 (before update):	
OP 34:	incr/10m	OP 35:	km	OP 48:	km/h	OP 99 (at MCU2/MCU3) locked ☐	

executed works

device cleaned ☐	oil level OK ☐ too much ☐, oiled with: _____ml	running belt tensed / relaxed: _____ turns	
maintenance list device checked ☐	maintenance list accessories checked☐	trial run OK ☐	FU-control analogue ☐ digital ☐
belt movement during reverse belt rotation: _____ turns	options file saved as a PDF-file (from MCU4 version 4.05.1) ☐		
direction: left ☐ right ☐	installed MCU: MCU 2 ☐ MCU 3 ☐ MCU 4 ☐ MCU 5 ☐ MCU 6 ☐		

notes:

firmware - update

the firmware was updated to _____ ☐ is already the latest one ☐ update rejected by customer☐

pre-set device type (e.g. 1.7 for h/p/cosmos mercury from manufacturing date 2008): _____

electrical safety measurements according to VDE 0701-0702 respectively VDE 0751-1 (DIN EN 62353)

☐ The checks, necessary after each service (even mechanical!) have been performed according to VDE 0701-0702 (for sports devices), respectively VDE 0751-1 (DIN EN 62353) (for medical devices) after finishing the service with separate control form. Next check is due on: _____

spare parts needed, including order numbers as well as their serial numbers for replaced and new parts

amount	spare part name	order no.	serial no. replaced part	serial no. new part

☐ lubrication and cleaning material ☐ shipping costs ☐ base sticker [cos11787] ☐ top sticker, year: _____ [cos14543-yyyy]

final report

☐ described problem was solved due to this service / installation was successful, the device can be used without limitations.
☐ described problem was not solved completely, the device can be used with this limitations:_____

start time:	time	working time:	h	☐ distance flat rate for	km
driving distance (one way):	km	driving time (one way)	h	☐ total trip	☐ distance proportional

place, date	stamp / signature customer, name in capital letters	signature technician, name in capital letters

original to h/p/cosmos factory in Germany pink print copy for the technician blue print copy for the customer

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[cos11686-en] service report form edition 20.12.2012 copyright h/p/cosmos

15.5 Control protocol – [cos11690en-02]

h/p/cosmos

control / test / inspection protocol for electric medical and sports devices

customer and device data

control form for service report no. & date: _____

customer name, ZIP-code, city: _____

device type: _____ serial no.: _____ construction year: _____

general information details about inspection procedure available at instruction „h/p/cosmos instruction for control protocol for electric medical and sports-devices"

☐ manufacturer: h/p/cosmos sports & medical gmbh / Germany ☐ manufacturer: _____

appliance class of device: ☐ I (one) ☐ II (two) ☐ III (three) ☐ first measurement ☐ repeat test ☐ test after repair

measuring instrument: _____ serial-/inventory # _____ next calibration date: _____

technician name: _____ company: _____ measurement date: _____

device under test ☐ B ☐ BF notes: _____

partial test of installation of the building	passed	failed
a) Check wall socket (outlet) and the internal wiring. Check if earth conductor (protective conductor), L1 (L2, L3) and N are correctly connected. Note: this is not a function test of the electric house circuit. The function and safety of the electric circuit of the building must be checked by a local electrician independently of this test.	☐	☐
b) Measured voltage at the wall socket: _____V (without load) Fuse at the electric circuit of the building: _____ A / Type: _____	☐	☐
visual device check		
c) Separate device from the supply network (mains). Separate connections to host/peripheral equipment (e.g. via RS232 interface). Remove data lines, additional functional earthing (potential equalisation) temporarily. After measurements have been performed all connections have to be reconnected!	☐	☐
d) Visual check electrical system: Electrical assemblies, electrical parts, mains connection lead (power cord) incl. cord grip and power plug, ground wire connection and ground wire assemblies at device and accessories must not show any damages that reduce the safety of the device.	☐	☐
e) Visually check mechanical system: Running-surface, rollers, belt spanner, running belt, elevation element with fixation screws, frame weld seams, fixation of screws and nuts, safety covers and motor hood at device and accessories must not show any damages that reduce the safety of the device.	☐	☐
f) Visually check pollution: Cooling openings and cooling fins, cooling slots and perforated metal covers, light barriers, running belt and non-slip step-stripes, treads and footboards at device and accessories must not show any damages that reduce the safety of the device.	☐	☐
g) Visual check of labels: Safety instructions and warning labels on device and accessories must be present, complete and legible according to instruction resp. device (running-machine) operation manual.	☐	☐
h) Fuses and micro-fuses, where applicable, which are accessible from the outside must be checked for the correct value and the correct labelling.	☐	☐
i) Check and – if necessary - adjust the belt re-entry zones at the back and at reverse belt rotation at the front as well. Gap must be below < 8mm. Consider: norms IEC EN 60601-1, EN 957-6, see "test-finger".	☐	☐
j) Latest version of the user/operation manual must be available on-site. User manual version must be compatible with the installed firmware and the installed accessories / options at the running machine.	☐	☐
k) Measurements: Users, patients and other third parties must keep a safe distance (more than 1.5 meters) during measurements and must not touch the device under test!	☐	☐

		☐ l) limit values DIN VDE 0701- 0702	☐ m) limit values VDE 0751-1/ IEC 62353	result of measurement	passed	failed
l) Check according to actual DIN VDE 0701-0702 Applicable for all h/p/cosmos devices of the category sports with CE As well as for all old medical devices supplied before 14.06.1998 (MDD became effective) see VDE 0751-1 part 1E **m) Check according to actual VDE 0751-1 (actual IEC / DIN EN 62353)** Applicable for all h/p/cosmos devices of the category medical with CE 0123						
n) Protective-resistance R_{SL} Measurement: Device with solid mains connection lead resp. device incl. removable mains connection lead in composite (according to VDE 0701-0702 the limit value is effective up to 5 m power cord and <16A, limit value is also applicable for old medical devices supplied before 14.06.1998).		0.3 Ω	0.3 Ω	_____ Ω	☐	☐
o) Protective-resistance R_{SL} for devices with removable mains connection lead (power cord) Measurement: only removable mains connection lead (power cord) medical devices (VDE 0751-1)		-----	0.1 Ω	_____ Ω	☐	☐
p) Protective-resistance R_{SL} for devices with removable mains connection lead (power cord) calculation: only device (between power plug and earth protected, tangible, conductible parts of the device) only med. devices (VDE 0751-1) calculation: measurement (n) minus measurement (o) = result (p) only device (n):_____ minus (o)_____ = (p):_____		-----	0.2 Ω	_____ Ω	☐	☐
q) Isolation resistance R_{ISO} (also applicable for all old medical devices supplied before 14.06.1998) measurement at U_{ISO} > 500 volts DC	appliance class I	> 1 MΩ	> 2 MΩ	_____ MΩ	☐	☐
	appliance class II	> 2 MΩ	> 7 MΩ	_____ MΩ	☐	☐
r) Touch current $I_{B\ or}\ I_{TOUCH}$ (only VDE 0701-0702 according to direct measurement procedure, at mains voltage, device must be „**isolated**")		0.5 mA	-----	_____ mA	☐	☐
s) Device-leakage-current $I_{DI\ or}\ I_{\Delta}$ (according to differential-current measurement method, at mains voltage)	appliance class I	3.5 mA	0.5 mA	_____ mA	☐	☐
	appliance class II	----	0.1 mA	_____ mA	☐	☐
	old medical devices	----	3.5 mA	_____ mA	☐	☐
t) Safety regulations: Running machine / device is directly plugged into the wall socket. The use of extension cables or multiple plug sockets is not permitted. A clear safety zone of min. L 2m x W 1m behind the device must exist (at running-surface W: >1m at least L: 2m x width of running surface)					☐	☐
u) Function checks: Function check speed, elevation and all existing emergency-off accessories at device and accessories have been performed.					☐	☐

v) Assessment of the check: checks & measurement results **OK (passed)**. Test badge placed with date-code for next check, date of next check:_____	☐		
w) Assessment of the check: checks & measurement results **not OK (failed)**. Customer informed and device put out of operation.	☐	customer's signature	technician's signature

form order-no [cos11690en-02] © 03/2011 h/p/cosmos version 24.03.2011

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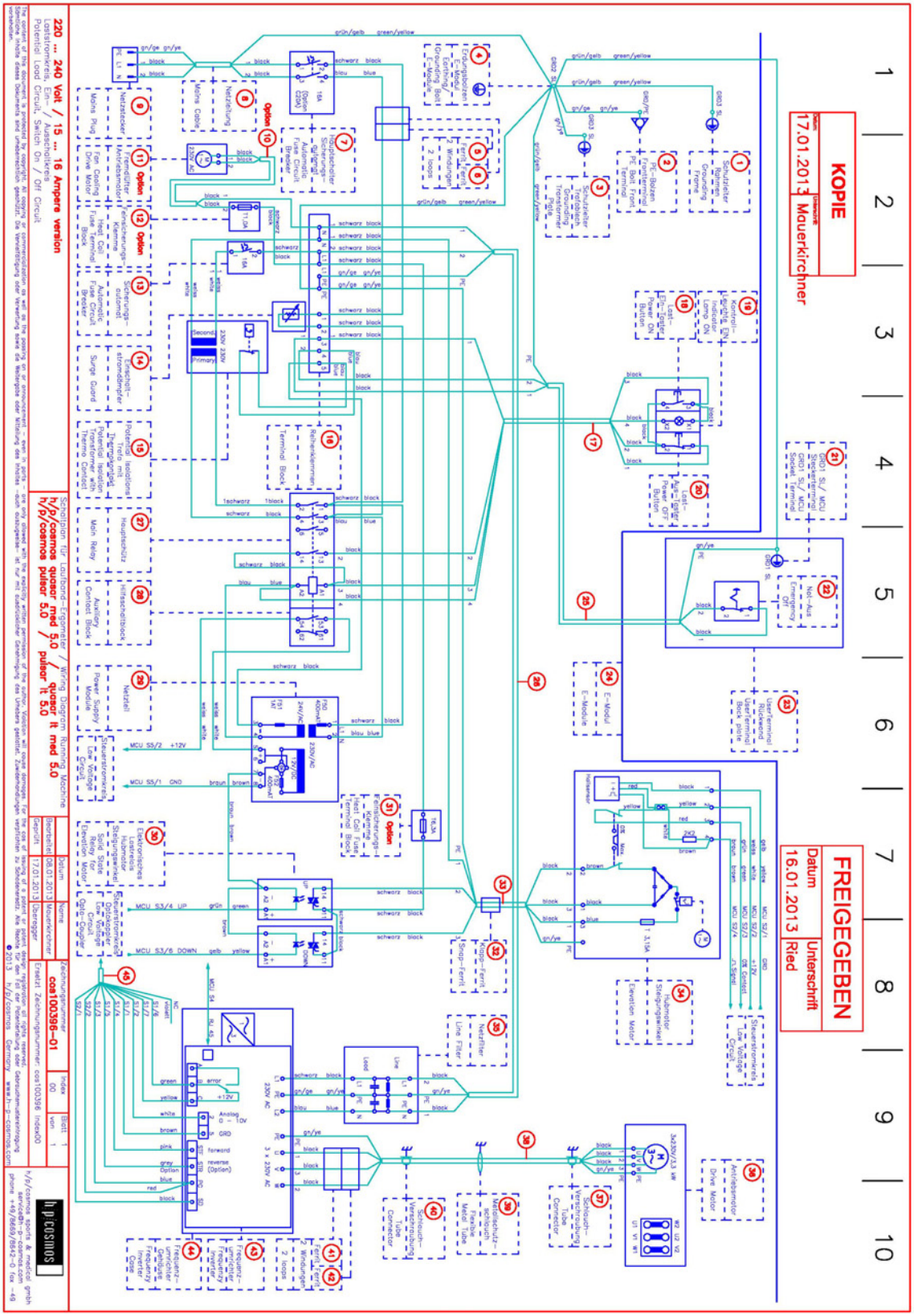
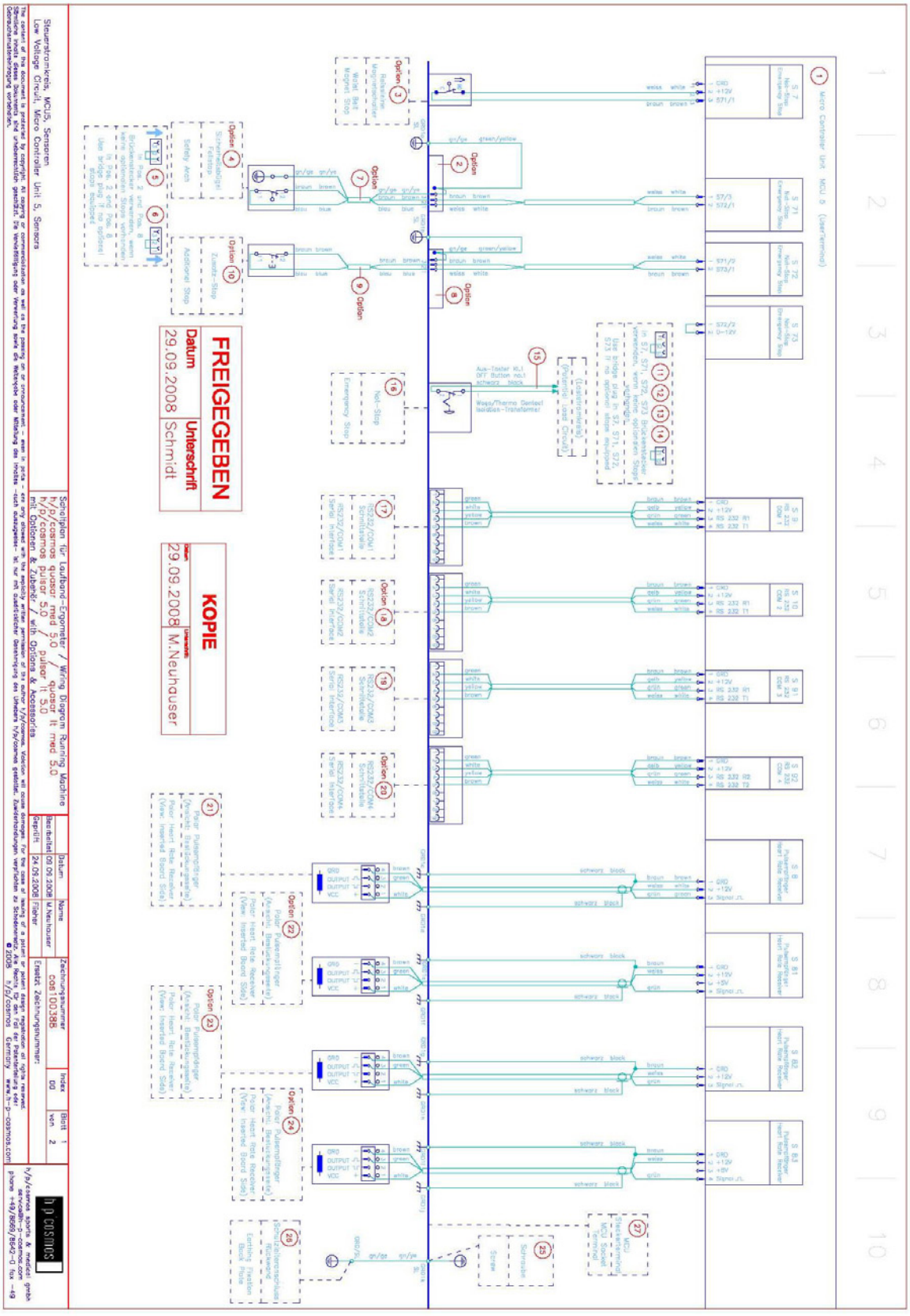
15.6 Wiring diagram load circuit quasar® med / pulsar®



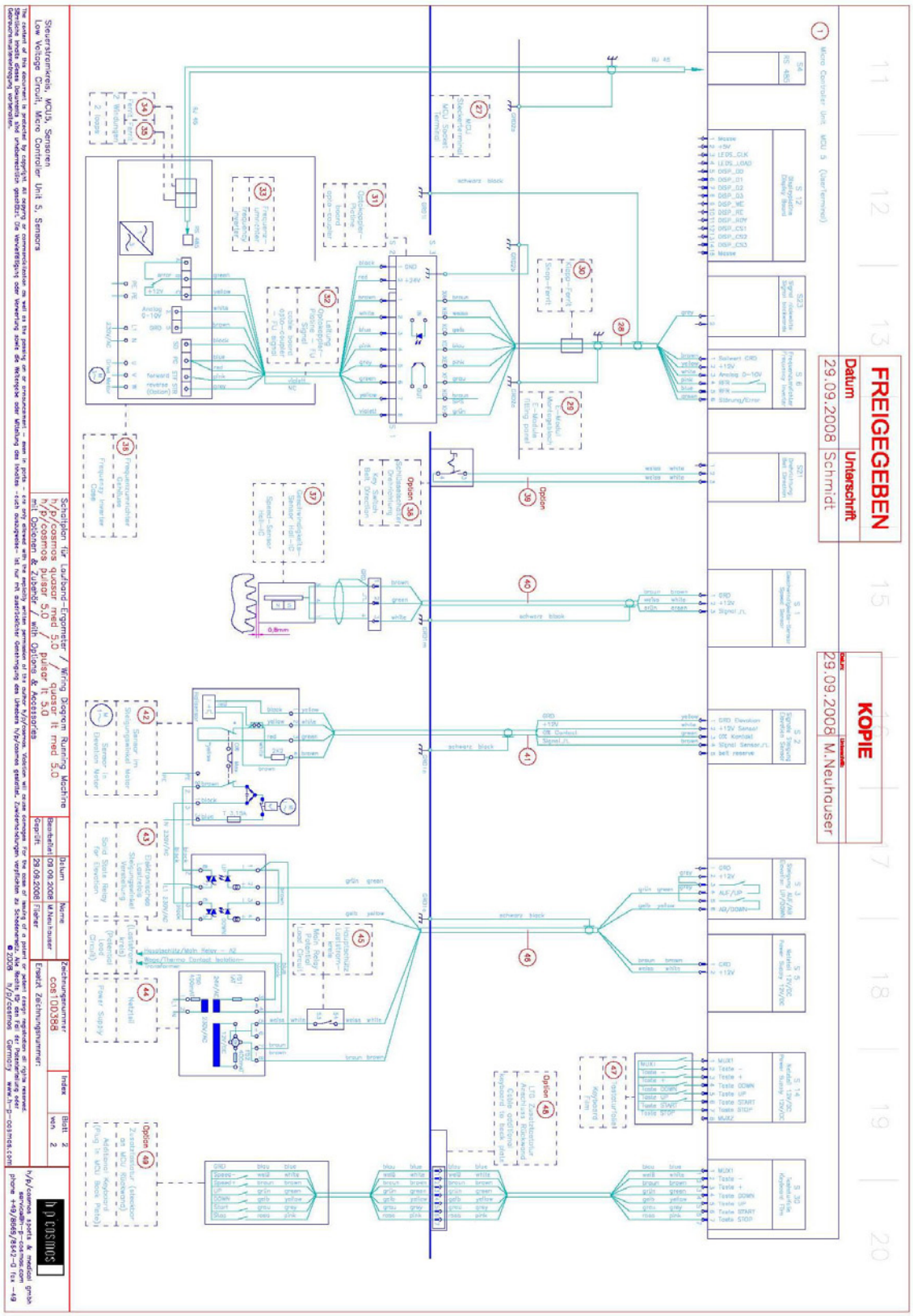
Colour Code neither US / nor Canadian standard!

15.7 Wiring diagram control circuit quasar® med / pulsar® – page 1



Colour Code neither US / nor Canadian standard!

15.8 Wiring diagram control circuit quasar® med / pulsar® – page 2



Colour Code neither US / nor Canadian standard!

16 Appendix 3: Symbols

All symbols used comply with the respective norms IEC417, IEC878, EN957-1 and Council Directive 2002/96/EC.

CE	EC Declaration of Conformity for sports and fitness running machines	CE 0123	EC Declaration of Conformity for medical running machines
	Read manufacturer's guide, advice, instructions and manual ISO 7000-1641		Protection ground IEC 60417-5019
	Symbol based on ISO7010:2003-M002. Follow manufacturer's guide, advice, instructions in the manual. Manual contains relevant safety information.		Earth IEC 60417-5017
	Warning / safety precautions Pay attention to accompanying instructions / ISO 7010-W001		Non-sterile product
	Manufacturer and year of manufacture		Potential compensation IEC 60417-5021
	Applied part of type B IEC 60417-5840		Chassis ground
	Applied part of type BF IEC 60417-5333		Risk/danger of entanglement
	Dangerous electric voltage IEC 60417-5036		Symbol for collection, treatment, recycling and disposal of waste electrical and electronic equipment (WEEE) as set out in directive 2002/96/EC of 27 January 2003 of the European Parliament and of the Council on waste electrical and electronic equipment. Necessary to reduce the waste management problems linked to heavy metals and flame retardants.
	Alternating current (AC) IEC 60417-5032		
	Alternating 3-phase current (AC) with neutral line IEC 60417-5032-2		
N	connection point for Neutral line IEC 60445		Warning of hot surfaces

17 Contact

For additional orders and technical enquiries please have the model type, serial number and installation date of your running machine ready. If you have any further questions about delivery dates, service or maintenance, orders for consumables etc., please contact the corresponding phone, fax or email for qualified help.

For service support and remote support we recommend to use additionally Skype with webcam.

Service department

phone	+49 86 69 86 42 0
phone direct	+49 86 69 86 42 25
mobile	+49 171 720 69 88
fax	+49 86 69 86 42 49
email	service@h-p-cosmos.com
skype	@h-p-cosmos.com (search & select name)

Sales department

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twitter	www.twitter.com/hpcosmos
facebook	www.facebook.com/hpcosmos
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